BULLETIN NO.

1903

# WISCONSIN FARMERS INSTITUTES

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IN

"The wealth of the nation comes primarily from the ground. As agriculture is our principal industry, so the great mass of our rural people are our main dependence; their patriotism, their public spirit, their welfare must ever be the salvation and glory of our republic."

—Gen. Nelson A. Miles.

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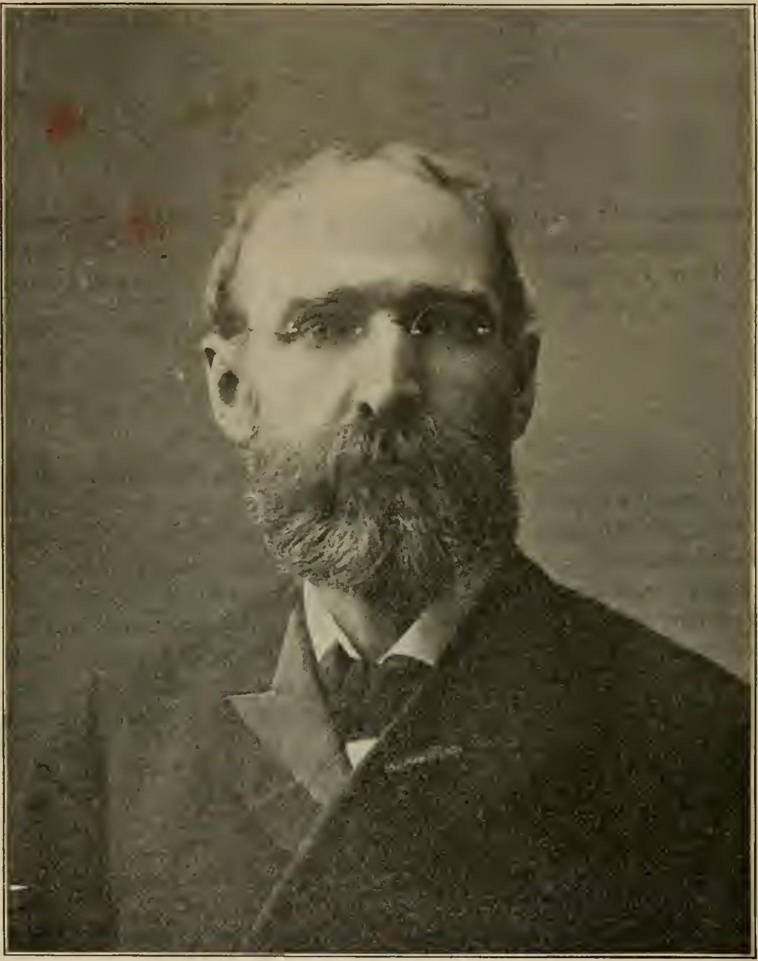
## WHAT WE OWE TO AGRICULTURE.

"In this country the agricultural interests, including the number of people engaged and the amount of capital invested in them, are equal to all others combined; and this being true, they are certainly entitled to the good-will and Godspeed, and to all the assistance and comfort that every man in the state and nation can give them. We will always, so far as I can see, be an agricultural nation; and if this is so, how can we better serve every man, woman and child than by fostering as far as possible the one interest that is equal to all other interests combined. The first step is to educate practically the farmer to follow his business in a businesslike way that will bring him a reasonably profitable return."

—J. J. Hill, President Great Northern Railway.



President C. R. VAN HISE.

# WISCONSIN

# FARMERS' INSTITUTES

## A Hand-Book of Agriculture.

## Bulletin No. 17.

## 1903.

A Report of the Seventeenth Annual Closing Farmers' Institute held at Marshfield, March 17, 18 and 19, 1903.

"The first farmer was the first man, and all historic ability rests on possession and use of land."—RALPH WALDO EMERSON.

**Edited by GEO. McKERROW, Superintendent**

*SIXTY THOUSAND COPIES ISSUED.*

Stenographic Report by Mrs. A. L. Kelly, Chicago, Ill.

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CLARK ENGRAVING CO.,
MILWAUKEE, WIS.

DEMOCRAT PRINTING CO
PRINTER,
MADISON, WIS.

# TABLE OF CONTENTS.

Page
University of Wisconsin .......... 8
College of Agriculture .......... 12
List of Farmers' Institutes for 1903-4 .......... 14
Address of Welcome, Mayor Pankow .......... 17
Response to Address of Welcome, L. E. Scott .......... 18
Improvement of Marsh Land, Ed Reichenbach .......... 18
Good Tillage, Thos. Convey .......... 23
Crop Rotation, Geo. C. Hill .......... 29
Strawberries, J. L. Herbst .......... 33
Bush Fruits, D. C. Converse .......... 38
Plums, C. E. Matteson .......... 42
Apples, R. J. Coe .......... 47
Roots for Live Stock, E. A. Croman .......... 51
Breeding Swine, L. P. Martiny .......... 54
Housing and Care of Swine, Jas. Fisher .......... 60
Feeding Swine, David Imrie .......... 65
The Goat, E. Nordman .......... 71
Good Roads, Chas. T. Harrison .......... 75
Agricultural Education, R. A. Moore .......... 87
Consolidation of Rural Schools and Transportation of Pupils, Supt. C. P. Cary .......... 95
Potatoes—Varieties and Seed, L. E. Scott .......... 109
    Planting and Growing, H. M. Culbertson .......... 114
    Harvesting and Marketing, Delbert Utter .......... 120
Raising the Best Hen, Mrs. Adda F. Howie .......... 123
Feeding the Hens, J. L. Herbst .......... 128
Incubator and Brooder Chicks, C. E. Matteson .......... 133
Agricultural Possibilities of Central and Northern Wisconsin, Prof. W. A. Henry .......... 141
Corn, D. B. Foster .......... 152
The Silo, W. F. Stiles .......... 160
Silage, C. P. Goodrich .......... 164
Garden Truck, Delbert Utter .......... 168
Forage Crops, Prof. Thos. Shaw .......... 174
The Value of the Trained Hand, Mrs. Nellie Kedzie-Jones .......... 186
Experience with Oat Smut, W. C. Bradley .......... 195
Co-Operative Creameries, E. A. Croman .......... 198
The Dairy Cow for Wisconsin, Prof. W. L. Carlyle .......... 205
Care of Milk, F. H. Scribner, Rosendale .......... 215
Fairs, Supt. Geo. McKerrow .......... 220
Clover, Geo. B. McGilvra .......... 227
Draft Horses, L. P. Martiny .......... 234
Breeds of Sheep, Supt. Geo. McKerrow .......... 239
Care and Feeding of Sheep, R. E. Roberts .......... 244
Beef in Wisconsin, Alex. A. Arnold .......... 249
New Questions from Box .......... 255
Resolutions .......... 257
Closing Remarks, Supt. Geo. McKerrow .......... 258
Household Economy, Mrs. Helen Armstrong .......... 259
Index to Advertisers .......... 265

Visiting Delegation of 40 German Agriculturists with Reception Committee o Wisconsin Agriculturists at Lunch in Live Stock Judging Room, University of Wisconsin.

# LETTER OF TRANSMITTAL.

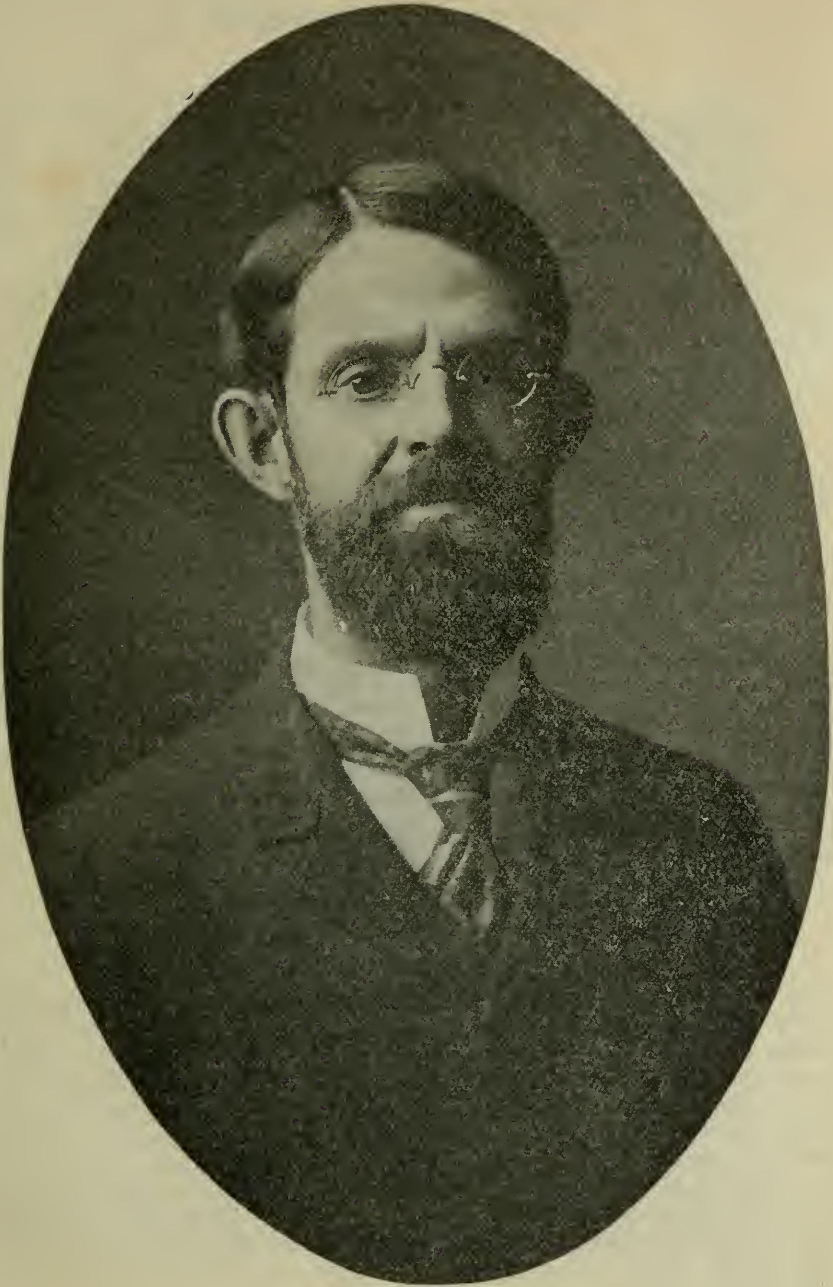
---

Hon. Geo. F. Merrill,
*President of the Board of Regents, University of Wisconsin:*

Sir:—I have the honor of herewith presenting to you Bulletin No. 17, of Wisconsin Farmers' Institutes.

Most respectfully yours,
GEORGE McKERROW, *Superintendent.*

Madison, Wis., Nov. 28, 1903.



Late E. S. GOFF.

Born 1852; died 1902. Professor of Horticulture, University of Wisconsin, 1893–1902.

# UNIVERSITY OF WISCONSIN.

## Board of Regents.

The President of the University, *ex officio.*
The State Supt. of Public Instruction, *ex officio.*

State at Large, William F. Vilas.
State at Large, Almah J. Frisby.
1st District, H. C. Taylor.
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6th District, Major C. Mead.
7th District, Edward Evans.
8th District, James C. Kerwin, Vice President.
9th District, E. A. Edmonds.
10th District, George F. Merrill, President.
11th District, August J. Myrland.

E. F. Riley, Secretary.

## Colleges.

College of Letters and Science.
College of Mechanics and Engineering.
College of Agriculture.
College of Law.
School of Pharmacy.
School of Economics and Political Science.
School of History.
School of Music.
School of Education.
School of Commerce.

## Courses.

Courses leading to A. B. degree.
Long Agricultural Course.
Mechanical Engineering Course.
Electrical Engineering Course.
Law Course .
Short Agricultural Course.
Dairy Course.
Civil Engineering Course.
Pharmacy Course.
Sanitary Engineering Course.
Applied Electro-Chemistry Course.
Pre-Metallurgical Course in Engineering.
Courses in Economics and Political Science.
Special Science Course, antecedent to Medicine.
Special Courses for Normal School Graduates.
Collegiate and Academic Courses in Music.
General Course in Engineering.
Courses in Domestic Science.

## Branches of Study.

The University presents a wide range of study, embracing more than three hundred subjects. Something of the extent and variety of these may be indicated by the following synopsis: Eleven languages are taught, viz.: Greek, Latin, Sanscrit, Hebrew, German, Norse, French, Italian, Spanish, Anglo-Saxon and English. In Mathematics there are twenty-six special courses. Under the Sciences there are a large number of courses in each of the following: Astronomy, Physics, Chemistry, Geology, Mineralogy, Zoology, Botany, Bacteriology. In History there are thirty-six courses; in Civics, twenty-eight; in Economics and Sociology, thirty-nine; in Mental Sciences there are twenty-three, embracing Psychology, Ethics, Aesthetics and Logic. There are eighteen courses in Pedagogics, and eight courses in Music, and two courses each in Military Drill, and Gymnastics.

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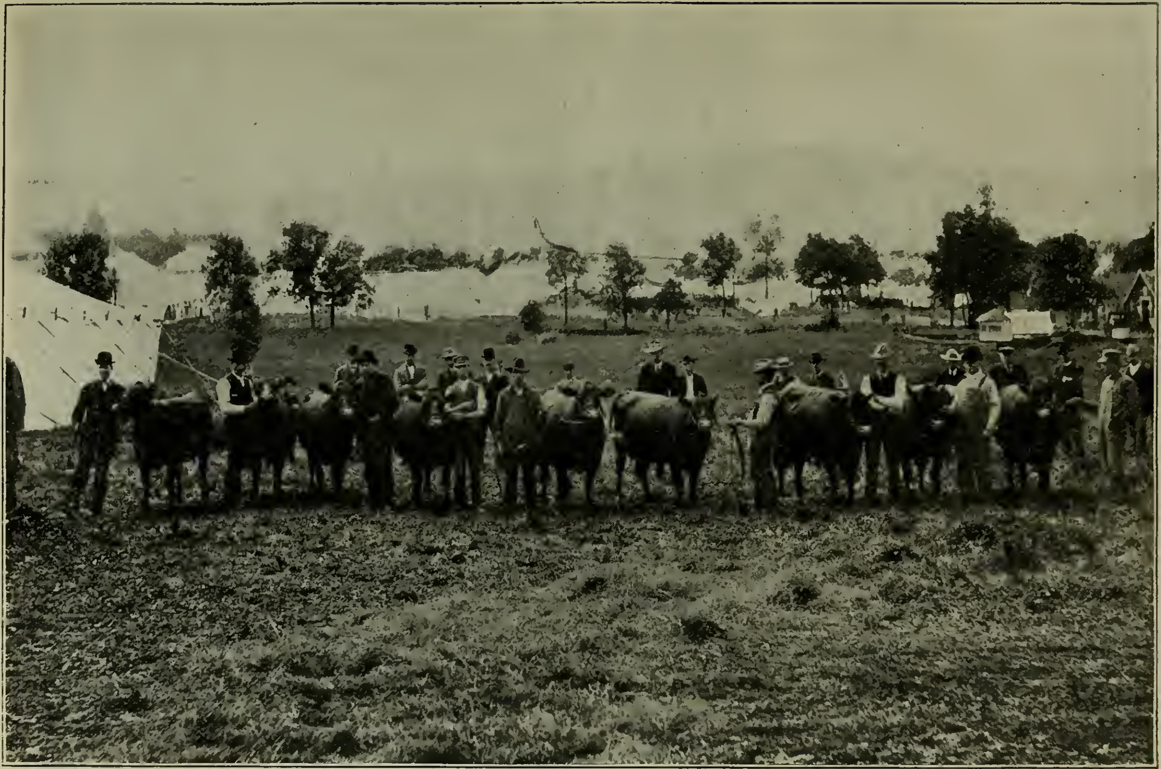
*Died October 28, 1903.



Red Polls Being Judged at Wisconsin State Fair, Sept. 10, 1903.

**Physical Culture:**—The Armory and Gymnasium is one of the largest buildings for its purposes connected with any institution of learning in the country. It is provided with rooms for lectures on Physiology and Hygiene, and for class and individual exercise in all the forms of gymnastic practice. There are also the most abundant and approved facilities for shower, sponge, and swimming baths.

Adequate accommodations are provided for the woman's gymnastics by the construction of an addition to Chadbourne Hall, which has been fully equipped. This furnishes ample facilities for systematic courses for young women, and is under the immediate direction of a trained instructor.

**In Mechanics and Engineering:**—Elementary Mechanics, Mechanics of Material, Mechanics of Machinery, Theory of Construction, Thermodynamics, Elementary Surveying, Railroad and Topographic Surveying, Geodesy, Sanitary, Hydraulic, Railroad, Electrical, Steam Engineering, Hydraulic Motors, Hoisting Machinery, Theory and Construction of Locomotives, Railway Locomotives, Railway Location, Railway Equipment, Construction and Maintenance of Way, Railroad Field Work.

**In Electricity:**—Electrical Testing, Electrical Plants, Electrical Construction, and various forms of drawing are given; also shop work in wood, iron, brass, both hand work and machine work, machine designing, construction and testing machines.

**In Agriculture:**—Various courses are given in agriculture. Animal Husbandry, Farm Management, Dairying, Agricultural Chemistry, Veterinary Science, Agricultural Physics, Horticulture and Economic Entomology, etc.

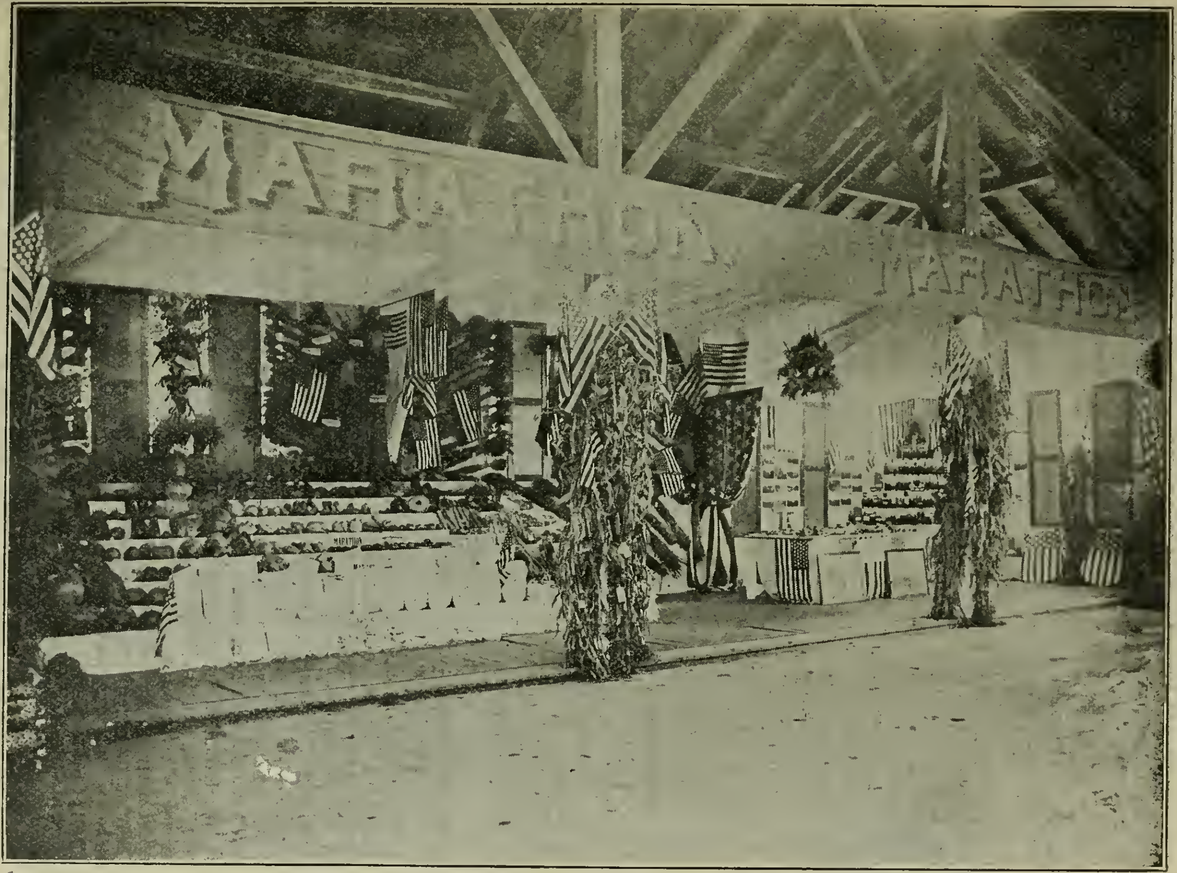
**In Law:**—Courses in Equity, Jurisprudence, Real Property, Constitutional Law, Wills, Contracts, Torts, Practice and Pleading, Law of Evidence, Corporations, Domestic Relations, Admiralty, Insurance, Estoppel, Partnership, Taxation, Criminal Laws, Common Carriers, Medical Jurisprudence, etc.

**In Pharmacy:**—Courses in Practical Pharmacy, Pharmaceutical Chemistry, Materia Medica, Pharmaceutical Botany, and Practical Laboratory Work.

**General Facilities:**—The Faculty embraces upward of 226 instructors. The laboratories are new, extensive and well equipped; embracing the Chemical, Physical, Metallurgical, Mineralogical, Geological, Zoological, Botanical, Bacteriological, Civil, Electrical and Mechanical Engineering, Agricultural and Pharmaceutical Laboratories. **Seminars** are held for advanced study in History, Language, Literature, Mathematics, and other branches.

The libraries accessible to students embrace that of the University, 78,000 volumes; of the State Historical Society, 228,000 volumes, including pamphlets; of the State Law Department, 37,000 volumes; of the city, 19,000 volumes, besides special professional and technical libraries, making in all more than 362,000 volumes, thus affording very exceptional opportunities for reading and special research.

Any person who desires information in regard to any of the colleges or schools, should apply to W. D. HIESTAND,
Registrar.


MARATHON
MARATHON

Marathon County Exhibit at Wisconsin State Fair, 1903; Awarded First Prize.

## UNIVERSITY OF WISCONSIN.

# COLLEGE OF AGRICULTURE.

### Committee on College of Agriculture and College of Mechanics and Engineering.

| | |
|---|---|
| H. C. TAYLOR, Chairman | Orfordville. |
| J. C. KERWIN | Neenah. |
| DWIGHT T. PARKER | Fennimore. |
| MAJOR C. MEAD | Plymouth. |
| AUGUST J. MYRLAND | Grantsburg. |
| PRESIDENT VAN HISE | Madison. |

### Officers and Instructors.

| | |
|---|---|
| THE PRESIDENT OF THE UNIVERSITY. | |
| W. A. HENRY | Dean and Director. |
| S. M. BABCOCK | Chief Chemist. |
| F. W. WOLL | Chemist. |
| E. P. SANDSTEN | Horticulturist. |
| W. L. CARLYLE* | Animal Husbandman. |
| GEO. C. HUMPHREY | Animal Husbandman. |
| H. L. RUSSELL | Bacteriologist. |
| E. H. FARRINGTON | Dairy Husbandman. |
| A. R. WHITSON | Agricultural Physicist. |
| U. S. BAER | Instructor in Dairying. |
| R. A. MOORE | Agronomist. |
| W. B. RICHARDS | Asst. in Animal Husbandry. |
| E. G. HASTINGS | Assistant Bacteriologist. |
| F. J. WELLS | Assistant Agr. Physicist. |
| A. S. ALEXANDER | Veterinarian. |
| F. CRANEFIELD | Assistant in Horticulture. |
| L. H. ADAMS | Farm Superintendent. |
| GEO. A. OLSON | Asst. in Agr. Chemistry. |
| J. C. BROWN | Asst. in Agr. Chemistry. |
| A. L. STONE | Asst. in Agronomy. |
| IDA HERFURTH | Clerk. |
| MRS. S. M. BRIGGS | Librarian. |

### Farmers' Institutes.

| | |
|---|---|
| GEORGE McKERROW | Superintendent. |
| NELLIE E. GRIFFITHS | Clerk and Stenographer. |

**I. The Agricultural Experiment Station** is devoted to a study of problems incident to the agricultural development of our commonwealth. It is supported jointly by the general government and the State of Wisconsin. Each year an annual report of several hundred pages and frequent bulletins are issued and distributed gratuitously among the farmers of the State. Any Wisconsin farmer wishing to receive these reports and bulletins regularly should send his request on a postal card addressed to **Agricultural Experiment Station, Madison, Wis.**

**II. Agricultural Instruction at the University.** The College of Agriculture offers instruction in agriculture to graduates of our own or other colleges, a four years' course leading to the degree of Bachelor of Science in Agriculture, special instruction to students of mature years, instruction in the Short Course in Agriculture requiring two winter terms of fourteen weeks each, and the course in Dairying lasting one term of twelve weeks. For information concerning these courses see this bulletin and write for catalogue, illustrated circulars, etc., addressing **W. A. Henry, Dean, College of Agriculture, Madison, Wis.**

**III. The Farmers' Institute.** Each year this practical school for the farmer holds more than a hundred two-day meetings in the farming districts of our commonwealth. These meetings are for practical instruction and conference on all matters pertaining to the farm and farm life, and at them 60,000 copies of the Farmers' Institute Bulletin are distributed annually. Any community can secure an institute upon early applicaion to the Superintendent. For further particulars concerning this school for the farmer, write **George McKerrow, Supt., Madison, Wis.**

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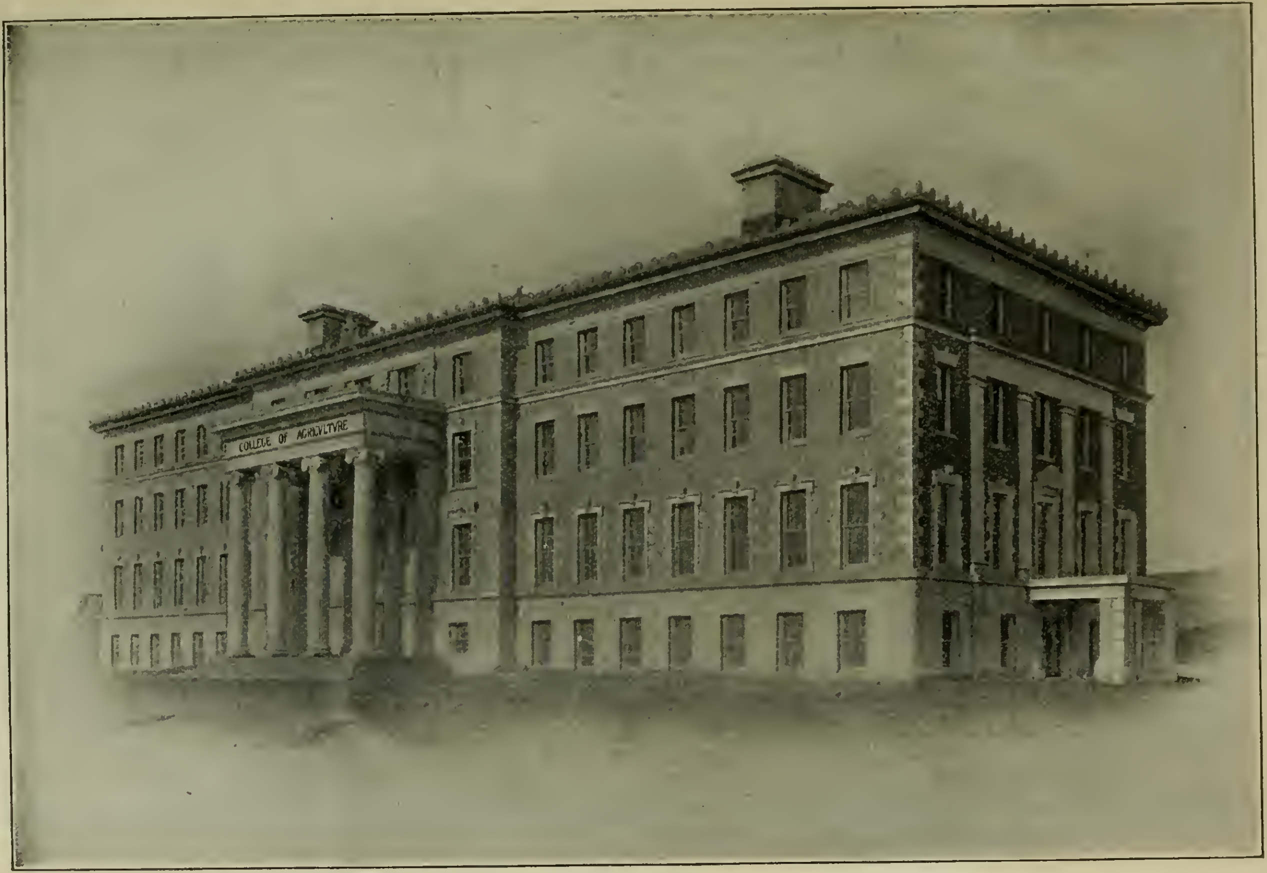
*Resigned Sept. 1, 1903.


COLLEGE OF AGRICVLTVRE

New Agricultural Hall.

## WISCONSIN FARMERS' INSTITUTES FOR 1903–1904.

Arranged by Counties.

| County. | | County. | |
|---|---|---|---|
| Adams | Grand Marsh, Monroe Center. | Marquette | Packwaukee. |
| Barron | Chetek, Cumberland, Turtle Lake. | Monroe | Cataract, Norwalk. |
| Buffalo | Cochrane, Modena. | Oconto | Abrams. |
| Calumet | Chilton. | Outagamie | Binghamton, Hortonville, Kaukauna (Closing Institute), Welcome. |
| Chippewa | Albertville, Auburn. | Ozaukee | Fredonia Station, Freistadt. |
| Clark | Brook, Colby, Loyal. | Pepin | Durand. |
| Columbia | Rio. | Pierce | Elmwood, Ellsworth, Malden Rock, Martell. |
| Crawford | Gays Mills, Seneca. | Polk | Clear Lake, Luck. |
| Dane | Cottage Grove. | Portage | Stockton. |
| Dodge | Brownsville, Neosho. | Racine | Union Grove. |
| Door | Jacksonport. | Richland | Cazenovia, Five Points, Ithaca, West Lima. |
| Dunn | Fall City, Sand Creek. | Rock | Newark. |
| Eau Claire | Eau Claire, Fairchild. | St. Croix | Glenwood. |
| Fond du Lac | Brandon, Eden, Marytown, Newfane. | Sauk | Russells Corners. |
| Grant | Burton, Livingston, Mt. Hope. | Shawano | Mattoon. |
| Green | Albany, Stewart. | Sheboygan | Plymouth. |
| Green Lake | Kingston. | Taylor | Medford. |
| Iowa | Arena, Barneveld. | Trempealeau | Blair, Eleva, Galesville. |
| Jackson | Black River Falls, Hixton. | Vernon | Coon Valley, Hillsboro, Ontario, Retreat. |
| Jefferson | Palmyra. | Walworth | Lake Geneva. |
| Juneau | Mauston. | Washington | Newburg. |
| Kenosha | Pleasant Prairie, Salem. | Waukesha | Big Bend, Dousman, Pewaukee. |
| Kewaunee | Pilsen, Slovan. | Waupaca | Marion, Waupaca. |
| La Crosse | Bangor. | Waushara | Poysippi, Wild Rose. |
| Lafayette | Benton, Woodford. | Winnebago | Menasha. |
| Langlade | Antigo. | Wood | Vesper. |
| Manitowoc | Collins, Louis Corners, Mishicott. | | |
| Marathon | Athens, Spencer. | | |
| Marinette | Pound. | | |

## INSTITUTES, WITH DATES AND CONDUCTORS.

| DATE. | W. C. BRADLEY, Conductor. | L. E. SCOTT, Conductor. | R. J. COE, Conductor. | GEO. WYLIE, Conductor. | F. H. SCRIBNER, Conductor. |
|---|---|---|---|---|---|
| December. | | | | | |
| 15-16 | Clear Lake | Luck | Chetek | Glenwood | Martell. |
| 17-18 | Cumberland | Turtle Lake | Sand Creek | Albertville | Elmwood. |
| January. | | | | | |
| 5- 6 | Welcome | Mattoon | Pound | Binghamton | Slovan. |
| 7- 8 | Marion | Antigo | Abrams | Pilsen | Jacksonport. |
| 12-13 | Athens | Spencer | Brook | Stockton | Grand Marsh. |
| 14-15 | Colby | Medford | Vesper | Loyal | Monroe Center. |
| 19-20 | Seneca | Five Points | Ithaca | Benton | Mt. Hope. |
| 21-22 | Retreat | Gays Mills | Arena | Livingston | Burton. |
| 26-27 | Salem | Big Bend | Newark | Woodford | Lake Geneva. |
| 28-29 | Union Grove | Palmyra | Albany | Stewart | Pleasant Prairie. |
| February. | | | | | |
| 9-10 | Auburn | Blair | Modena | Eau Claire* | Maiden Rock. |
| 11-12 | Fall City | Durand | Fairchild | Ellsworth* | Cochrane. |
| 16-17 | Hixton* | Mauston | Rio | Barneveld | Pewaukee. |
| 18-19 | Eleva* | Blk. Riv. Falls | Packwaukee | Dousman | Cottage Grove. |
| 23-24 | Bangor | Galesville* | Cazenovia | Ontario | Cataract. |
| 25-26 | Hillsboro | Norwalk* | Russells Corners. | West Lima | Coon Valley. |
| March. | | | | | |
| 1- 2 | Waupaca | Brownsville | Hortonville* | Kingston | Neosho. |
| 3- 4 | Eden | Poysippi | Menasha* | Brandon | Wild Rose. |
| 8- 9 | Mishicott | Marytown | Newburg | Freistadt | Chilton.* |
| 10-11 | Collins | Louis Cor. | Newfane | Fredonia Station | Plymouth.* |

*Cooking school held in connection with Institute.

Eighteenth Annual Closing Institute, Kaukauna, March 15, 16, 17, 1904.

All inquiries relatives to Institutes will be promptly answered.

GEO. MCKERROW, *Superintendent*,
Madison, Wis.

Group of Farmers' Institute Workers in Attendance at International Association at Toronto, Canada, June 22-24, 1903.

# PROCEEDINGS

OF THE

# SEVENTEENTH ANNUAL

# *Closing Farmers' Institute*

HELD AT

# MARSHFIELD, WIS., MARCH 17, 18, 19, 1903.

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The Meeting was Called to Order by Superintendent McKerrow.
Conductor R. J. Coe Called to the Chair.

**Prayer by Rev. J. F. YOUNG, of Marshfield.**

---

Mayor Pankow.

## ADDRESS OF WELCOME.

### Mayor PANKOW, Marshfield, Wis.

Mr. Chairman, Ladies and Gentlemen—Having been selected to address this meeting, I will try to do so as briefly as possible. It is not every day that a city has within its walls such an educational institution as the Closing Farmers' Institute, and I can assure you that our citizens and surrounding farmers will show their appreciation and thank you sincerely that you have selected our city in which to hold this meeting.

Our city is located in the center of this rich agricultural state, and the surrounding country is rapidly becoming one of the choicest and richest farming and dairy sections in the northwest. It gives me great pleasure to welcome you to our city, and I can assure you that our citizens will make it their special duty to see that you are all made comfortable and taken care of. I feel that our time can be better employed than in speech-making, therefore, hoping that this meeting will be an agreeable and profitable one to all, I hereby bid you welcome.

### RESPONSE TO ADDRESS OF WELCOME.

**L. E. SCOTT, Stanley, Wis.**

Mr. Mayor, Ladies and Gentlemen:—The pleasure expressed is mutual, and it affords us much pleasure to be with you in this Closing Farmers' Institute.

It is a pleasure to those who live further south and perhaps a revelation to many of them to witness the great development that is going on here in what they have been pleased to term northern Wisconsin, but which, as your mayor says, is really central Wisconsin. We notice, with pleasure, the disposition on the part, not only of your farmers, but of your business men of the city of Marshfield to co-operate with us in this great educational work.

We thank you, as mayor of the city, for these words of welcome, and assure you that we appreciate them, and while we are here we will try to behave ourselves at least, and do the best we can to make this a profitable week.

## IMPROVEMENT OF MARSH LAND.

**ED. REICHENBACH, County Surveyor, Jefferson, Wis.**

The low estimate placed on the average unimproved marsh, owing to the limited amount of its present product, has in recent years revived considerable interest among farmers who are familiar with results obtained from proper drainage and cultivation. And from a financial point of view the real value of land may reasonably be based upon the amount of its product under improved conditions. And further, the utility of substantial country homes, providing wholesome conditions for the industrial training of future generations of farmers, represents certain fundamental principles justifying our best energies in agricultural pursuits. In the list of items contributing to the development of the world's resources, the proper drainage of our marshes deserves intelligent consideration and as an inducement to encourage the purchase and improvement of marsh lands, certain knowledge of their productiveness under improved conditions is necessary.

The long continued and extensive demand for country homes, the marvelous development of American agricultural resources by means of labor-saving implements and modern methods of tillage, and the improved facilities for transporting farm products to good markets, have given popular stability to investments in farm lands and these conditions are naturally followed by perceptible advance in values of most lands capable of human habitation; even the most remote nooks and corners of the earth are sought out for speculation and development. The further utilization of our own native resources now becomes a subject of vital interest to the thoughtful farmer. Although large areas of fertile marsh lands are as yet comparatively undeveloped, Wisconsin ranks high in domestic and commercial importance.

These conditions being considered, let us investigate the question of successful tillage of the thousands and thousands of acres of fertile marsh lands situated right in the very midst of regions possessing ample markets, railroads, schools, churches, highways, and all modern conveniences essential to the welfare of modern civilization. There are splendid opportunities for investment of moderate means in property surrounded by wholesome conditions where established advantages exist. The development of resources now lying dormant in our unimproved marshes should receive due consideration before investing large sums in high-priced land. Thousands of the highly improved farms in southern Wisconsin are estimated to be worth high prices. Other thousands of farms among these contain wet depressions, ponds, and marshes, which, if drained and properly cultivated, will be worth many times their present estimated value. A long list of practical examples might be cited if space permitted in this paper.

### Some Results of Tile Draining.

A noteworthy philosopher in the early history of intelligent farming announced that to make two blades of grass grow where but one grew before is a public benefit. If he should return to Wisconsin and investigate the results of tile drainage, he would include potatoes and corn in the list of benefits. A farmer drained his marsh and planted fifty bushels of potatoes where none grew before. He harvested one thousand bushels and he estimates that the tile drains increased the value of his land four-fold. These drains were laid about six rods apart and two to three feet deep, on a grade of eight inches per thousand feet. Greater depth could not be obtained without extending main drain long distance in a neighbor's land, and, although the lower land suffered from excessive moisture, causing frequent loss of crops, the owner would not have a tile drain laid. The potatoes were grown in 1902, during an unusually wet season. The surface soil was a black loam with a bit of peat intermingled, and the lower strata was a light clay and hardpan containing some stones.

Another practical example of the results of tile drainage is that of a farmer who laid twenty-five miles of drains in a farm of 320 acres. The larger part of this land was too wet much of the time even for wild pasture, a large per cent. of the remainder was usually too wet for cultivation early in the season and during rainy summers, and among the higher elevations were wet depressions and ponds which interfered with advantageous working of the surrounding or adjacent land. The crops grown were inadequate to justify the amount of money and labor expended. After the drains were laid, clean, smooth fields a mile long yielded ample feed for ninety cows and half as many young cattle; potatoes and hogs were sold by the car load, and now the farm is sold for the neat sum of thirty-five thousand dollars. The branch drains on this place are laid eighty to one hundred feet apart, and their arrangement is such that all the water delivered by the branches is carried off by three main tile drains and there is not an open ditch on the farm.

### A Tile-Drained Peat Marsh.

Here is an example of the results obtained from a tile-drained peat marsh of sixty acres. The place had been robbed of its natural product nearly half a lifetime without any substance being returned to the marsh, except during the wet seasons when the hay could not be harvested, because the peat was too soft to enable teams to work on it. The peat was three to five feet deep, would burn freely if dry, and was underlaid with light clay and ledges of thin, flat limestone. Before drainage it was estimated that this marsh would produce interest on six dollars per acre. The average land buyer would not have been willing to pay six dollars per acre for this marsh. Three tile drains of good size and depth were laid on a fall of one inch per hundred feet, one through the middle and one at each side, and these were united to a large main tile drain. Ordinary quantities of stable manure were spread out evenly over the well-cultivated surface, and corn, timothy, red-top and alsike clover were successfully grown, the usual product being about two-thirds that of regular farms and there was no failure in sixteen years.

### An Ohio Onion Crop.

The great onion plantations on peat marshes in Ohio have produced wonderful results with proper drainage, fertilization and thorough cultivation. One of these immense gardens of one hundred and sixty acres in the wet season of 1902 produced seventy thousand bushels of onions and the quality and size of the fruit is far superior to onions grown on clay land. Sixty thousand bushels of onions is not an unusual yield in this wonderful garden and thirty thousand dollars per year is not an unusual income from the sale of these onions. This place is strictly a peat marsh, of the sort which will burn and drift in high winds when dry, and the drainage is two to three feet deep on extremely light fall. Large quantities of stable manure and commercial fertilizers are applied in accordance with established methods and the cultivation is thorough in every particular. Tomatoes and celery of excellent quality thrive equally well on this land. The famous celery fields, embracing several thousand acres in Michigan, were originally peat marshes, duplicates of which are quite numerous in Wisconsin.

### Drainage for Low Lands in Wisconsin.

The ordinary clay marshes of Wisconsin, and the usual depressions, ponds and wet parts of cultivated fields, require little or no fertilization after proper drainage to produce good crops. I can cite numerous examples among prominent farmers who successfully grow all kinds of crops on tile-drained land, which before drainage was waste land, and since corn and clover,—the best feed for dairy stock—thrive best on this land, it follows that land values will advance and as dairy interests grow the land best adapted to produce forage crops will become the most valuable.

In southern Wisconsin there are hundreds of farms more or less disfigured with ponds, marshes, and crooked depressions too wet for cultivation, and many of these waste places are so situated as to form crooked boundaries and odd shapes within regularly cultivated parts of fields. The disadvantages of working between and around these barriers are not denied, and it should be quite as easy to comprehend the advantages of having such nuisances removed by drainage, to enable farmers to advantageously work over the entire length and breadth of their fields without the loss of time and damage to crops while turning back at the ponds. In many instances the actual loss of time and crops at these superfluous turning-back places will, in a single year, exceed the cost of drainage and the superior quality of these wet places, if drained, would yield even greater reward for money and labor expended. To avoid unnecessary waste is one of the leading elements of success in business.

A sample not unusual in the results following tile-drainage in Wisconsin marshes is that of a forty-acre tract which was previously listed on the tax roll as "swamp land." It was considered waste space, with the exception that an inferior quality and scant quantity of marsh grass and weeds were produced, and bog shoes were required to enable teams to work upon it. The place was tile-drained at a cost of sixteen dollars per acre and later produced as large crops of corn and hay as regular farm lands costing high prices.

During the last twenty years I have personally superintended the drainage of upwards of twenty thousand acres of land. This is but a percentage of the total area of the land requiring drainage in Wisconsin. There are scores of farmers who would not take the trouble to investigate the claims made for tile drainage as a reliable means to improve farm lands; meanwhile a more progressive class of farmers recognize the dormant resources awaiting development in our unimproved marsh lands, and with proper knowledge of the existing facts concerning the agricultural possibilities of fertile Wisconsin marshes now in the market at very reasonable prices, there is a marked tendency to hesitate about investments in the scattered remnants of cheap lands yet remaining in the out-of-the-way land markets of the far west, where life may be too short to profit by the long waiting for the common comforts of life to materialize.

### Land Values in the West Increasing.

Time was when splendid selections of land in the far west and southwest could be made at trifling cost. Conditions have changed. As the American Indians retreated civilization advanced. It is now a popular theory that numerous modern conveniences are essential to human welfare and happiness and the rapid settlement of new lands has resulted in marked increase of land values, even in the new west. Modern families desire congenial environment among an advanced class of people. Established business conditions and reliable political and social rules have gained prominence.

But what has all this to do with tile-draining the marshes? So far as the congenial surroundings of home contribute to domestic comforts, and so far as the improved conditions of the soil render financial success a simple task, these statements are applicable. The average farmer cannot afford to occupy a farm simply for the pleasure of a country residence and improved lands have advanced in value to such an extent that makes it a financial consideration to buy and improve cheaper farms in an equally good country. In due time these cheaper investments will command a liberal net gain above actual cost of improvements and, if it is wet land, tile drainage will be a leading factor in producing the results sought.

## DISCUSSION.

In the absence of Mr. Reichenbach, Mr. C. P. Goodrich of Ft. Atkinson was called upon to lead the discussion.

Mr. Goodrich—I have attended court a good many times and listened to the witnesses giving their evidence, and have heard the lawyers cross examine them, but this is the first time that I was ever in court where the witness, after giving his direct evidence, disappeared and another man was called on to answer the questions on cross examination.

Supt. McKerrow—I want to say that Mr. Reichenbach is the county surveyor of Jefferson county, and for some sixteen or eighteen years preceding Mr. Reichenbach in that capacity, Mr. Goodrich held that office, so it comes very appropriately that Mr. Goodrich should answer your questions, because he has done lots of surveying and draining in Jefferson county.

Mr. Coe—Is it your opinion that a good many of the farms of southern Wisconsin could be drained advantageously?

Mr. Goodrich—I feel sure they could, because I know that a good many of them have been drained so as to make them a great deal more valuable. I have done some of that work on my own farm. I commenced about eighteen years ago on some land that was not very valuable. Well, I bought it for $25.00 an acre, and the tile draining added $50.00 an acre to its value. I could have sold it for $75.00 an acre right away.

Mr. Brigham—And how much did that tile draining cost you?

Mr. Goodrich—About $20.00 an acre.

Mr. Brigham—What fall did you have?

Mr. Goodrich—An inch to a hundred feet will do, if you can't get more, though that is a very light fall, and the tile must be well laid so that there are no places where the water will stand and deposit sediment.

Mr. Brigham—What depth do you lay tiles?

Mr. Goodrich—It depends on the kind of land. On my land I put them down three and a half and four feet, for the reason that the water came from below and made the land cold and wet, and the further down I got the tile the better it would drain the land, for it intercepted that water before it reached the surface. On some other land that I have tiled, clay land where the water would hardly soak through at as great a depth, I put them down three feet, and that is deep enough.

Mr. Scott—What is your opinion about this so-called hard pan in central and northern Wisconsin? Can we drain through it?

Mr. Goodrich—I have had no experience in it, but I think you can drain through it. It will seem almost impossible sometimes, when you know that water will not soak through two inches of that soil in its natural state, but after the tiles have been laid, and the ground frozen, it commences to thaw out from the bottom. The land is expanded and heaved up when it is frozen, then when it thaws out from the bottom the surplus water goes out and it never settles back to be as solid as it was before.

Mr. Everett—It seems to change the character of the lower strata entirely.

Mr. Goodrich—Very much. Mine used to be so sticky that I could hardly plow it at all before it was tile-drained, when it was wet, and when it was dry, it would turn up in great chunks like rock. It does not work that way at all now; it has let in the air and taken out the surplus water. It is the first land I can work in the spring, or after heavy rains.

Mr. Hume—Will it pay to tile what is called "swamp" land in this country, where we raise a pretty good crop of grass?

Mr. Goodrich—If it will produce a better crop now than after it is tiled, of course it won't pay.

Mr. Hume here exhibited a bunch of tall grass to illustrate the pending question.

Supt. McKerrow—What do you call that grass?

Mr. Hume—I think it is Red Top.

Mr. Reitbrock—No, that is Blue Joint.

Mr. Goodrich—Will this produce a continuous crop year after year if it is cut in July at the time it is in the best condition for hay?

Mr. Hume—I think so.

A Member—It will cut four tons to the acre, nine years out of the ten.

Supt. McKerrow—Then will it pay to tile it?

Mr. Goodrich—Not unless it is so soft you can't get onto it.

Mr. Gaffney—Could you use small stones to take the place of the tiling?

Mr. Goodrich—I never have had any experience in that, but I have seen some land that was drained that way, and after awhile the drains were filled up.

Mr. Gaffney—Do you put anything at the head of the drain to keep the sediment from running into the tiles?

Mr. Goodrich—Into the top end, yes. Cover it with a flat stone, or something that will keep the mud from coming into it.

Mr. Hill—This paper speaks about draining peat lands and about raising large crops of onions. Have you had any experience in draining peat lands?

Mr. Goodrich—I have drained some that had some peat, perhaps one or two feet in places, but I never raised onions. I had to put manure on that land before it would raise anything very well.

Mr. Hill—How far apart would you have your drains?

Mr. Goodrich—Mine are four rods apart in some places. There are a great many places where you can by one line of tile drain a great deal of land. In one place I have a hill, and at the base of that hill are some of the wettest parts of the marsh, the water that goes into the ground back on the upland comes out of that place. By putting a line of tiles right along the base of that hill, I dried the land for fifteen or twenty rods below that.

Mr. Hume—A great deal of the marsh land in this country is overflow land. Would not ditches be better than tiling?

Mr. Goodrich—Perhaps so. If it would raise valuable hay, that is another question.

Question—What is the average size of your tiles?

Mr. Goodrich—The small drains, three inches, at least, and that is as small as I would recommend.

Question—Will cattle thrive when turned onto pasture land with that kind of grass that is shown here?

Mr. Goodrich—I don't know, probably somebody else can answer that better than I can.

A Member—They couldn't reach the top of it.

Mr. Roberts—I drained some peat land three years ago and I got a fine crop of flax on that land. I have had two immense crops of corn on it since, and I don't know of any way that the farmer can spend money that will bring back quicker returns than for tiles if he has low land.

Question—How does the frost affect this tiling.

Mr. Goodrich—It won't hurt it anywhere, except at the outlet if it is exposed, where it freezes and thaws.

Question—Doesn't it ever heave them?

Mr. Goodrich—Never did mine.

Mr. Roberts—I make a long box at the end of the tile, a plank box.

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# GOOD TILLAGE.

THOS. CONVEY, Ridgeway, Wis.

Few farmers appear to realize the importance of good tillage. I will first consider the improvement of the soil.

## Three Requisites for Producing Good Crops.

To produce good crops, so far as the condition of the land is concerned, three things are essential: sufficient available plant food; moisture, and proper mechanical conditions, and the latter is by no means the least. Only a small percentage of the plant food in even a very rich soil is immediately available; the tendency to waste in a soil bare of growing plants, especially at moderate or high temperature, is unavoidable. The loss of soluble plant food is principally through leaching. This loss is principally nitrates, or the available form of nitrogen. A soil rich in nitrates may lose fertility rapidly by being so saturated with water as to exclude free oxygen, deoxidation takes place, which sets free nitrogen gas. While a sufficiency of moisture is absolutely indispensable, an excess of it is equally bad, for nearly all farm crops refuse to grow in a water-logged soil.

Aeration of soil is rarely considered in tillage, free oxygen is just as essential, as potash, phosphoric acid, or nitrogen. Unless the land is kept in such condition that oxygen can reach root hairs or terminal roots of plants, growth is impossible. This is true even of trees—only the hardiest of our forest trees can survive much tramping or compacting of the soil. The humus or organic matter in the soil can only be prepared for plant food through the admission of oxygen, hence the disadvantage of getting manure too far from the surface. In a heavy clay soil, or a water-logged one, it may remain unavailable for years.

When we desire to grow leguminous crops, the porous soil is absolutely indispensable. The bacterial growth that always occurs in connection with a thrifty leguminous crop can only survive where the soil is sufficiently porous to enable the nitrogen of the air, or soil, to combine with oxygen and form nitrates, in connection with potash, lime, and other elements in the soil.

You may ask, what has this to do with tillage? Everything. Few soils are so poor that they do not contain enough of plant food to produce several crops if the right kind of tillage is given. The mechanical working of the soil is only a part of the process, others I will mention. The growing of leguminous crops is one of the most important. This improves the mechanical condition and adds one of the most valuable elements—nitrogen. This feature of the question is to be presented later and by another speaker.

### Application of Fresh Manures Important.

The second in importance is the application of fresh manures. I say fresh because I mean it. As near as can be determined, there is a loss of 60 per cent. of the plant food where it is reduced to the well-rotted condition before applying. The fermentation of fresh manure in the soil warms it, the litter holds the moisture, but not in excess, both tend to liberate plant food already in the soil, and the humus promotes aeration. Of course I am not recommending the use of strawy manure late in the season, when there may not be sufficient moisture to saturate it, and it might leave the ground so open it would dry out.

Mr. Convey in His Cornfield—Tall Man and Tall Corn.

### Plowing in of Green Crops.

The third method of improvement would be green manuring, or the plowing in of green crops. This may not be necessary on good land, unless we wish to resort to the very highest type of farming. That is, keep a growing crop on the land as nearly all of the time as possible, sow clover with spring grain, or, rather, with all grain sown; I sow corn ground with rye, and plow down the following spring. The latter does not add much fertility, but prepares plant food and holds it, prevents blowing and washing of the soil, and improves the mechanical condition.

### Mechanical Working of the Soil.

The mechanical working of the soil is no doubt what Mr. McKerrow had in mind in assigning the subject to me, and it is a big subject to discuss in ten minutes. I will try and rough harrow it.

Deep preparation is very desirable. A deeply prepared soil will best hold the necessary amount of moisture. Shallow working, or preparing land for a crop, promotes washing and drying out. Deep soils permit of deep preparation, especially where fall plowed, or better subsoiled, but sandy soil with a porous subsoil, or light prairie soil does not permit deep preparation. Fall plowing has the following advantages: it hastens the getting in of a crop, a matter of great importance; the land derives more benefit from the action of the frost, and on stiff clay land, used largely for grain raising, it appears to be indispensable. Its disadvantages are: the soil washes; a bare soil loses fertility. In some localities it blows badly. The snow blows off also and while the deep freezing may be and no doubt is beneficial, most of the spring and winter rains run off and leaves the subsoil comparatively dry. We do no fall plowing now. Grain is sown on clean corn ground, after being prepared with a disk. We give good preparation with disk, and harrow, and then sow with a drill. Where we have plowed beside the disked ground, the latter gave best results.

We plow land once in three years, that is, plow clover land for corn and potatoes. A sharp harrow with perpendicular teeth is one of the best implements to fine the surface and compact the subsoil sufficiently. While a porous soil is essential, an open or lumpy soil is positively destructive to a crop; it dries out with a dry atmosphere, besides the subsoil moisture cannot ascend where the soil is not sufficiently compact. With a soil that has been exhausted raising grain, or one where a series of cultivated crops has been raised, the soil particles run together with a heavy rain and get in such condition that it is impossible to raise a good crop. As the ground dries out it bakes and seams or cracks, the result of bad farming. Too much fining or cultivation of this kind of soil gets it in better condition to run together if sown to small grain.

### How to Preserve Moisture.

For fourteen years out of the last sixteen a short supply of moisture in the south half of the state has shortened the crop very materially. There has been a short supply, not only during the growing season, but also a deficiency of subsoil moisture. The supply at present is nearly normal; let us take care of it. How? By harrowing or working fall plowing as soon as it is sufficiently dry, no matter whether you are ready to crop or not. A day's work when the ground is in proper condition is worth two after ground is dry and lumpy. Harrow winter grain as soon as ground is dry enough to work well. This is the best way to put in clover seed. It will make a better crop of grain, it breaks crust, kills weeds and is better done with a sharp harrow with upright teeth. With spring plowing, keep harrow close after plow; this saves labor as well as moisture. It is the stitch in time.

### Cultivation.

Harrow after corn planter, if you do not the ground will dry out where tramped with horses or packed with planter wheels, besides this is the best time and way to kill weeds. By using a sharp harrow once a week in a corn field, we can drill corn and keep it clean. We always harrow or cultivate after every rain, as soon as the ground is sufficiently dry. The harrow usually answers the purpose until corn is six inches high. If the ground gets in such condition that a harrow or weeder does not mellow all of the surface, we resort to more vigorous treatment. The weeder is a very useful implement when rightly used. It will only kill weeds just after sprouting, it will not work a hard surface. We use it mostly just after a cultivator and sometimes, when the ground is mellow, instead of harrow, to cultivate a crop. Cultivate as soon after a rain as ground will work. This is the most important thing.

The usual style of cultivator is radically wrong. Large shovels at right angles with the line of draft take a maximum of power and leave ground in poorest possible condition. It leaves the ground uneven, lumpy and open, rarely stirs all of the soil and usually goes too deep, besides it usually leaves some solid ground exposed. It loosens the ground so much that it dries out; it is too open to permit of root growth; on rolling land it washes badly. It does about everything it should not do and nothing desirable. The perfect cultivator is easy of draft, because it slices or pulverizes; it merely prepares the top soil to kill weeds and provides a dust mulch to hold moisture. It does not force the root growth into the subsoil, but permits them to remain where the conditions are best, heat, oxygen, fertility. This makes a difference of about two weeks in maturity of corn, means more dry matter and more feeding value.

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## DISCUSSION.

Mr. Jones—A good many of the farmers up here spread manure on top of the snow; is that beneficial, do you think?

Mr. Convey—Yes, I prefer to handle it in that way. It is really preferable to spreading the manure on bare, frozen soil, there is less likelihood of washing and the fertility will be leached out in the top soil.

Question—But on a hilly farm, wouldn't it be wasted?

Mr. Convey—Possibly, but not so much so as in the case of bare ground, and there would be much less loss than to leave it in the barnyard. I prefer to top-dress grass land.

Question—Do you recommend harrowing right after plowing in the fall?

Mr. Convey—No, sir, I would not; it is better in the rough condition, it is less inclined to blow and will mellow up better in the winter time.

Mr. Culbertson—How about subsoiling on sandy soil?

Mr. Convey—It might not do the sandy soil any harm. I think it would not be equally as advantageous as in clay land.

Question—Would you employ subsoiling in the fall or spring?

Mr. Convey—The fall in every case; never do any subsoiling in the spring.

Mr. Coe—That is only on clay soil.

Question—Would not spreading manure on fall plowing have a tendency to make it weedy?

Mr. Convey—It would. For many years I have recommended the spreading of manure on fall plowing and then disking in, but you have a little more difficulty in getting your land in condition in a wet season.

Question—Is there any benefit in dragging after plowing in the spring?

Mr. Convey—It should not be neglected until the land dries too much or it becomes lumpy.

Question—Would you work ground when wet?

Mr. Convey—Oh, no, I never would work the land when wet. There might be some advantage in working sandy land while it was moist, but that would be a disadvantage to the good condition of clay soil. It would make it compact and hauling manure over the land under those conditions is not wise. That is one reason why I prefer the winter application of manure.

Supt. McKerrow—As soon as this land is fit you work it?

Mr. Convey—Oh, by all means. If you let it go a day or two too long you cannot do as good work as if you just get at it when the proper conditions exist. It will mellow up and prevent the weeds from starting.

Question—Do you use a manure spreader, or do you think it desirable?

Mr. Convey—I have not used a manure spreader, but I think we will all have to come to using it. It won't be perfect in every respct, but it will have this advantage over the old system that it produces an even distribution of manure, and that is something absolutely necessary. Where we have it evenly spread, it seems to have as good results as where it is spread much more heavily, but unevenly. It is a labor-saving device also.

Question—Can you use it in cold weather?

Mr. Convey—By keeping it under cover, I think so. That was the only thing that has kept me from using it before, the trouble I might have with sloppy manure.

Mr. Goodrich—Will Professor Moore tell us if they use the manure spreader at the Station?

Prof. Moore—Yes, we do, and find it a labor-saver.

Mr. Goodrich—Some people say they can't use it in the winter time. My son in western Iowa had one that he used in the winter time and took the manure out every day, but he kept the manure spreader, when not in use, in the barn, where it did not freeze, and he had no trouble all winter. Of course he did not have sloppy manure. He had absorbents to take it up.

Mr. Marsden—Is it a good plan in the spring to thoroughly harrow the manure, or would you leave it in chunks?

Mr. Convey—Oh, yes, that is a proper thing to do. You get a lump of manure in the soil and it is really a detriment to the growing plant.

Question—What kind of a cultivator do you use?

Mr. Convey—Well, I would not recommend any special make, I use a disk cultivator with a leveler. It runs at an angle, but it leaves the soil open without a leveler, which would not be desirable, but several of the manufacturers put on levelers, and after the disk the leveler closes it up again so it will not wash or dry out, and that leveler will place the weeds right on top of the soil, so they will kill off. If you can control the depth of cultivation, I prefer the disk. I would not have a cultivator that will not cultivate all the soil and leaves part of it uncultivated. When you have such conditions that you can control the depth of cultivation and conserve the moisture, you are all right. I would not use a cultivator without some kind of a leveler to follow.

Question—In cultivating corn or potatoes, would you recommend level cultivation or hills?

Mr. Convey—Level cultivation is preferable in the majority of soils. With some kinds of low, flat lands, there might be some advantage in ridging your land under some circumstances, but, as a rule, it is a disadvantage.

Mr. Thompson—What observation or study have you made of how much manure you can use with the manure spreader to the acre and get an ordinary crop, and then by spreading the manure by hand, Professor Moore?

Prof. Moore—I never have carried on actual experiments in that line, but there is a great deal in the equal distribution of the manure. I don't know just how much advantage.

Mr. Thompson—From what studies I have made in the use of stock manure and the question of waste, it is absolutely certain that of the amount of manure that is put onto an acre fully fifty per cent. of it is never realized in crops, and therefore I believe that the one great advantage in the manure spreader is not in the labor you save, but in the fact that the manure is more evenly distributed over the soil. That is a lesson we have got to learn in order to use manure to the best advantage. What would you call a fair amount of manure per acre?

Mr. Convey—It depends on circumstances. If your soil was comparatively poor and the manure was in good condition, such as would come from a dairy barn where commercial foods are fed, you might use fifteen tons to the acre, but I prefer to put on not over ten tons to the acre, and have it evenly distributed.

Question—What do you consider deep cultivation?

Mr. Convey—I am an advocate of deep preparation of the soil; the deeper the better, if the quality of the soil will permit. In leachy soils, deep preparation will not do. Keep the surface soil rich with manure and leguminous crops, and keep a growing crop as nearly all the time as you can. Shallow preparation will not take up rain-fall, nor hold it, but deep cultivation of a growing crop is ruinous, especially in a dry season. Two inches is sufficiently deep where all of the soil is stirred and left level, or nearly so.

Question—With clay land, would you plow deeper than with sandy land?

Mr. Convey—By all means, yes. A gentleman who is a very successful grain grower has said that in preparing land for wheat he always fall-plowed his land, and he turned up about an inch of new soil in the fall and in that way gradually deepened the soil. Now, if he were to turn that inch of raw soil on spring plowing or for a corn crop, the crop would not thrive. It makes too much of an air-tight soil, so that it would not be desirable in that case, but for a wheat crop under those conditions I believe it is a very good system. Raw subsoil should be exposed to the action of the atmosphere for six months to remove objectionable elements, and get it in fit condition for plant growth.

# CROP ROTATION.

**GEO. C. HILL**, Rosendale, Wis.

The object of good farming is to produce profitable crops, aiming to grow such crops in a way that the fertility of the soil is maintained.

Experience and observation show that crops grown in a system of rotation are produced more profitably than in continuous cropping. The reasons for this are beginning to be understood by those who observe plant growth and soil fertility. The experiment stations, also, are helping to solve these problems, bringing to light some things which explain cause and effect.

We are all familiar with lands in the older sections of the state formerly having rich virgin soils, now poor and not producing half as well as when new, unless the crop of weeds they now produce is reckoned into the account. Wheat farming and the absence of live stock growing are largely responsible for this waste. But we see many farms in the same older sections in a high state of productiveness, resulting from a better system of management, including live stock and rotation of crops.

## Results of Continuous Grain Cropping.

Continuous grain cropping wears out the soil faster than most other lines of farming. The small grain crops have much the same root system and draw from the soil the same elements of plant food year after year. The soil has no rest in which a new supply of these particular elements might become available. The vegetable matter becomes exhausted, not much manure is used, the soil becomes lighter in color, harder to pulverize, loses its power to hold moisture and probably the soluble nitrates are wasted by leaching, washing and oxidation, while the land lies bare from August to April; weeds increase from lack of cultivation and grass growing; destructive insects, rust and smut become more prevalent.

Continuous growing of cultivated crops is less obejctionable, provided the culture is clean and manure is supplied. We are told that soils contain mineral elements sufficient to supply plant food for centuries. Tillage in the cultivated crop makes these elements available, so the cultivated crop is of great utility in a system of rotation.

A comparison of continuous grain growing, with the rotation of grain with grass and clover for fifteen years in Indiana, showed a gain by the latter method, for corn twenty-two per cent., oats twenty-six per cent., and wheat forty-four per cent. At the North Dakota Station wheat after cultivated crops increased seventy-five per cent. Prof. Ladd, of the North Dakota Station, maintains "that a system of rotation which alternates humus-producing with humus-consuming crops, two of the former to three of the latter, with proper cultivation and use of barnyard manure and the prevention of unnecessary loss from the soil, should keep the soil in a high state of productiveness, without the aid of commercial fertilizers, for a thousand years." We hope this is a fact, but some things in my experience of nearly fifty years on the same land favors a doubt. While we have followed mainly the system outlined by Prof. Ladd, we find our soil abundantly supplied with humus and nitrogen, yet there seems to be a lack of phosphoric acid and potash. There is a great growth of straw and good yield of grain, but the quality seems not as good as formerly. Doubtless there is much to be learned, but with present experience I feel safe in recommending a rotation, the main crop to be live stock, with clover and grass, corn and small grain to feed the stock and feed the farm. Fortunately for the Wisconsin farmers, the soil, climate and markets favor the production of these crops. Just how we shall arrange the rotation to suit our individual circumstances, no rule can be laid down. A person's taste (the taste depends a good deal on whether it pays), kind of soil, and location on level or hilly lands, has much to do in determining what is a judicious system. Rolling lands should have a longer rotation, increasing the number and duration of the grass crops in proportion with the increased hilliness of the lands.

### The Most Practical Rotation.

The shortest practical rotation is one of three years; clover, corn and oats or wheat. This plan is practiced by many having lands in permanent pasture. It is only suitable for level lands, because two years in three the land is in cultivation and the one year clover would not develop the mass of root growth which two years in mixed grasses would do, consequently the soil might be in condition to be injured on rolling lands.

A four year rotation is of wider utility. Two years in clover and grass, first year for hay and the second for pasture; third year manured and planted with corn or other cultivated crop; fourth year small grain and seeded again. With this plan the land lies two years of the four in grass and grows a stronger sod.

Some farmers might want more small grain, or more corn than one crop in four would give. In that case, the rotation could occupy five years, putting two grain crops, or two corn crops in the five, alternating a clover and grass, or a cultivated crop with every grain crop. Every grain crop should have clover planted with it and if possible the corn crop too should be added with a clover crop. In case of failure of the clover, peas and oats is an excellent substitute to keep up the rotation. The land should receive a dressing of manure at least once during the rotation.

The value of the clovers and grasses in the rotation is well known. Aside from their feeding value in hay and pasture, they are recuperative in their effect on the soil, and are specially useful on the hilly farms of our western counties. In no other way can these lands be preserved near their natural condition, except to use them mostly for grazing, occasionally putting in cultivation for two years and then reseeding. Some of the best farmers of these lands say they are discontinuing the raising of as much corn as formerly, because of the loss to their lands by washing, substituting more beef and dairying in the place of hog raising.

I believe the best rotation for a steep hillside is a forty or fifty year rotation of growing timber. Nothing else will so well preserve the natural condition of such lands. Such a crop would conserve moisture, add beauty to the landscape, and in many ways be the most useful and lasting blessing we could leave to those who come after us.

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### DISCUSSION.

Question—You refer to trees, do you mean fruit trees?

Mr. Hill—No, I refer to forest trees; I would not be particular about its being hillside either. I want to preserve the timber as much as possible.

Question—Do you mean on land worth $125.00 an acre?

Mr. Hill—Yes, if I was going to live on that land or anywhere near it.

Question—We have got some pretty good forest preserves up here we could let you have.

Mr. Hill—You are getting rid of them as fast as you can. Many farmers are not saving as much as they should.

I have a young growth of timber that I planted out twenty-five years ago, and we are getting a good deal of comfort out of that and some good fuel.

Question—In seeding corn ground to clover, what has been your experience, would you seed it and cut the corn for silage? Do you get a good stand of clover in that way?

Mr. Hill—We have tried it a little, but we have not been successful. We can cover it with rye. We put wheat after our corn land and seed with clover, and we have very good results; if winter grain, seed it the next spring.

Mr. Thompson—How much stock should be kept and how many loads of manure would you use to the acre in your system?

Mr. Hill—I think one hundred acres ought to keep fifty head of stock. If you do that, raise plenty of grain, and have straw enough so that you can utilize the manure made from that stock, you will get over the land once in four years, at least we do that. Of course we have some permanent pasture and that does not get dressed with manure every four years, but it is occasionally dressed.

Mr. Convey—Mr. Hill speaks of the humus wasting faster out of soil that has been used for grain largely. He did not speak of a very important feature of his method, and that is the absorptive capacity of land in that condition. That class of soils is inclined to wash badly, and they not only are not in condition to take up moisture, but they do not hold the moisture.

Mr. Hill—They are cultivated continually, so that the humus is washed out of the soil. We broke up a sidehill a few years ago that had been pastured for a great many years, and we noticed that the soil did not wash at all. It was so full of roots and decayed matter that it absorbed all the moisture that fell on it. The soil does not wash away until it is saturated and soil in that condition will contain more than double the water that soils will hold that are not in that condition.

Mr. Coe—We see land all over this state that has been tilled and robbed of its humus, and has been washed full of gullies, totally ruined.

Question—What is the best kind of grass crop to sow on this land, clover alone?

Mr. Hill—Clover alone, if it is only going to remain one year, but if more than one year, I would put in timothy and mixed grasses, and in a permanent pasture nothing is finer than blue grass, which will come in itself. I know of no grass that will hold the soil like blue grass.

Mr. Coe—Unless it is quack grass.

Mr. Hill—Yes, that will do it.

A Member—When blue grass gets a little old, my cattle won't eat it from the middle of June to the first of July—some call it "red top." I call it Kentucky blue grass. It is the first that grows in the spring and the first that dies out.

Mr. Hill—It should not be allowed to go to seed. If it is kept right down short, it will grow all summer, and be just as fresh in midsummer as earlier in the season.

Mr. Coe—A good remedy is to put a little more stock on.

A Member—I have to burn it off with a torch sometimes.

Mr. Hill—You haven't got enough cattle.

The Member—If you have too many cattle on a small piece, you are up the spout when the dry season comes on in August.

Question—Is not white clover just as good as Kentucky blue grass?

Mr. Hill—White clover generally grows with blue grass.

Question—I think this is an important matter about burning off the grass. What do you think of that system of handling pasture land?

Mr. Hill—We never have had any experience, except in burning marshes. We don't think it hurts marshes.

A Member—I think it does hurt

grass land. I have seen the system followed by a party in our neighborhood until the grass land has all run to weeds, and it would not hold moisture at all. I think the grass should be allowed to lie down on the surface and to act as a mulch and promote bacterial growth in the soil. In fact, I think it is the most valuable thing that could be placed there, except stable manure.

A Member—I have pasture that I have had for eighteen years and I have got more to burn this spring than ever before. As soon as the blue grass gets a little big the cattle walk around it.

Mr. Goodrich—I appreciate this gentleman's difficulty in not having any feed after the June grass is gone. He should have a variety of grasses in a permanent pasture, one that will grow early in the spring, and other kinds coming along later and so on through the whole season. June grass makes a second growth in the fall, when it does not stalk at all, and makes a very good feed. It very rarely produces much feed in the middle of the summer, whether it is allowed to go to seed or is fed off closely.

Mr. Croman—What this gentleman said is true in regard to blue grass drying up certain seasons of the year. In our locality we don't have much of the blue grass pasture after the middle of July and we get around it by planting a permanent pasture of mixed grasses. I will give you the mixture that we sow, two bushels to the acre, and we add two pounds of timothy seed to this mixture; tall oat grass, orchard grass and alsike. Now, the seed comes fourteen pounds to the bushel, we sow two bushels to the acre and we have found it to be a great benefit to sow this mixture and then you can get grass the whole year through. When the dry weather comes in August we have green grass for our stock. The tall oat grass will come along after the June grass. In the beginning we sow alsike, red clover and timothy. Of course the clover will soon die out; the alsike will stay to a certain extent, but you will find that your clover will die out and the other grasses will come in and will stay by you.

Mr. Scott—Alsike is a stayer in Central Wisconsin.

Mr. Hubbard—I have on my place considerable land that I put into a pasture, sowing a mixture of timothy, alsike and white clover, but the timothy and alsike disappeared very soon and June grass came, and the white clover remains. I have a very excellent pasture of June grass and white clover, I get two or three crops of June grass in the year. I keep stock enough to keep it fed down so there is nothing to burn. I have had some experience with grass on marsh land and to burn the soil over upon which that kind of grass grew would give us perhaps three or four times as much hay as we would get other years. We burn it off in the spring while the ground is yet wet and we get a good crop of that kind of grass.

A Member—When I talk of burning grass, I mean before the grass starts at all. Where the burnt grass has been, the cow will find a green spot.

# STRAWBERRIES.

J. L. HERBST, Sparta, Wis.

Mr. Herbst.

It seems almost impossible that I will be able to give anything new in the line of growing the strawberry. Most all of our agricultural papers of today have a horticultural department and in these columns are found from time to time brief and timely hints on how best to care for the strawberry bed.

It has always seemed strange to me why the farmer with so much land could not give time to care for at least the small patch that would supply his family with fresh berries for three to four weeks and still have plenty to preserve for the winter use. A small bed, say two rods wide and four rods long, if properly planted and taken care of, will do this and you will have plenty to spare for a neighbor or some one who is not fortunate enough to have them.

I do not advise the average farmer to go into the strawberry business on a large scale, because as a rule he is not in a position to do the work as regards the various details which must be given the business if it is to be carried on successfully, but if the farmer who has not been so fortunate as to have strawberries from his own patch will ask his neighbor or any one who has he will invariably receive the reply, I would not be without a strawberry bed.

But very little work and expense will be required to plant and take care of the bed. A plot of ground two rods wide and four rods long will need about four hundred plants and these can be purchased from some nearby plant dealer. Most any soil will grow the strawberry. Among all the fruits, they will thrive on most any soil and under various conditions and there is hardly a farmer in our state who cannot grow this fruit on his land if it is properly taken care of.

### Some Good Varieties.

Plant some of the varieties that are well known. Do not get the high-priced varieties just because they are a little larger, or that they will grow two berries where some other produces one. The old, time-tried varieties are good enough for you and you will be just as well satisfied. The best varieties that I can recommend for the home garden are the Warfield, Haverland, and the Lovette. These are all good in yield and quality and good, strong growers. Plant one-third of each, placing the Lovette every third row so as to fertilize the Warfield and Haverland, as these two varieties are pistillates and need to be fertilized.

### Directions for Planting and Care of Plants.

The bed should be located near the house, if possible, and upon well enriched soil. Plow and make the ground fine and mellow and keep it this way throughout the season by hoeing and cultivating.

Set your plants as early this spring as possible, so they will get a good start. Place the rows three and one-half feet apart and set plants one and one-half to two feet in the row. The plants can be set with a spade or dibble, being careful to have the crown of the plant on a level with the surface of the earth. If the soil is inclined to be dry, it is a good plan to wet the roots while setting and firm the soil well about them with the foot.

As soon as the plants are set, go over the bed with the cultivator, getting as close as possible to the plants without disturbing them. Use a garden rake to work the soil between the plants in the row. Keep clean of all weeds and in the fall you should have the gaps well filled into a matted row. The runners as they appear will be thrown around in the row with the cultivator teeth and fill in the vacant spaces and where a space is not being filled, take up some of the new plants where they are thick and fill in.

**A Well Matted Strawberry Bed.**

When the first heavy frost appears in the fall the rows should be well filled and the bed should be covered and for this you can use straw, cornstalks, or any coarse litter that is not filled with weed seeds. Spread on lightly so as to protect the plants from the thawing and freezing weather of fall and spring. Do not cover with manure direct on to the plants, as invariably a good many of them will not survive this treatment. If you wish to apply manure to the bed place it on top of the covering in the fall and allow it to leach through during the spring thaw.

As soon as the danger of heavy frost is over in the spring and the new leaves appear, remove the covering to the vacant spaces between the rows and allow it to remain there, as this will protect the fruit from sand and dirt and act as a mulch to the plants during any dry weather that may occur.

A new bed can be set from this patch the following spring, taking plants from the rows where they are the thickest, and each year a new plot set out, being careful to use only the new plants, as the plants that have yielded are entirely worthless to reset.

The bed that has produced can easily be made into a new bed by a very little work. As soon as it is through fruiting mow off close and burn over. In doing this you will destroy many weed seeds and destroy any insects that may have collected. Plow a back furrow between the rows, cutting them down to about six inches. Go over the bed now crosswise with a drag, leveling it off and working the ground between the plants.

When the plants start, begin to cultivate the same as a new bed and the following season you will be surprised at the results.

## DISCUSSION.

Question—Wouldn't it be well to make your bed a little longer and a little narrower?

Mr. Herbst—You can make it to suit yourself. The longer it is, the more easily cultivated.

Question—Suppose your garden is eight or ten rods long, wouldn't you have the strawberry rows run clear clear through?

Mr. Herbst—Yes, I would.

Question—What varieties would you use to fertilize the Warfield and the Crescent?

Mr. Herbst—The Splendid is good, the Lovette is good, and the Bederwood is good. Of course I speak of the farmer's garden.

Question—Have you had experience with the Senator Dunlap?

Mr. Herbst—I have not. From what I have read about it, I find it is claimed by all who have grown it to be equally as good as the Warfield and better in some respects.

Mr. Hubbard—When you speak of plowing after picking your crop to prepare for the next year, what part of the bed do you plow?

Mr. Herbst—Plow up the center of the old row. For instance, here is one row and there is another. Plow so as to throw a furrow right back over the center of those two rows, leaving the new plants, the outside plants, for the next year.

Mr. Hill—Don't you think, that for the average farmer, it is a pretty good plan to make a new bed every year?

Mr. Herbst—Yes, he can make it almost a new bed, if he is careful, every year.

Mr. Scott—Do you throw them back over the old row or between the rows?

Mr. Herbst—Over the old row, leaving the outside plants that were previously set for the new row next time.

Mr. Cook—As I understand Mr. Herbst, we leave the same side of the row every time. Commencing on the west side of the row, we plow all the west side of it so as to have the same number of rows. We used to plow between the rows.

Question—Do you allow the runners to grow over the center?

Mr. Herbst—No, sir; as soon as they have a good matted row, I would cut off the runners. You can do that easily by fastening a rolling colter on your cultivator. I leave a space about a foot between each row for a path.

Question—Have you ever tried cultivation during the time you were fruiting your berries?

Mr. Herbst—I have not, for the reason that we have to remove the mulching and place it on again.

Question—Have you ever had experience with hardwood sawdust as a mulch between the rows?

Mr. Herbst—No, sir, I have not.

Mr. Coe—Would you think it would pay to cultivate just before the fruiting season?

Mr. Herbst—For the farmer's garden, I don't know but what it would, a small patch. It wouldn't take much time to take off that mulch and put it on again. Of course you would have some dirt on the berries if you cultivate in fruiting time, I should not want to do it then.

Mr. Coe—I would not before, either.

Question—Are you troubled with white grubs?

Mr. Herbst—Yes.

Question—What do you do with them?

Mr. Herbst—I don't do anything with them. I let them work. Whenever a plant is taken out. I reset a new one.

Mr. Matteson—What is the cause of them and how do they get there?

Mr. Herbst—I suppose they get there the same as in any soil.

Mr. Matteson—Isn't it where you manure heavily?

Mr. Herbst—I don't think so. This piece of soil I speak of had not been manured for three years.

Mr. Hill—It had not been in sod either?

Mr. Herbst—No, sir.

Mr. Scott—Isn't it a fact that they are more prevalent where the old land has been kept down for a number of years?

Mr. Coe—I think so. We never have had much trouble where we planted on cultivated soil, but if they do get into your strawberry bed I advise you to get after them. If you see a plant wilt, dig until you find the grub, and kill it. They will soon destroy one plant and go to the next, and one of those creatures will do a whole lot of mischief. You can find them if you dig long enough, and it is the only way I know anything about that will destroy them.

Question—Do you manure the strawberry patch?

Mr. Herbst—I would prepare my strawberry patch in the fall and then plow it again in the spring.

Question—Do you start with a propagated plant?

Mr. Herbst—I start with a new plant, plants that have never fruited before. I have a propagating bed.

Mr. Convey—Mr. Herbst speaks of burning off the bed after taking the crop. With a heavy mulch, isn't there danger in a dry time of injuring your plants?

Mr. Herbst—If your season is very dry and your mulch very heavy, you must use judgment about it.

Mr. Coe—There is a great deal more danger in a damp season. If you can have your mulch perfectly dry, so that the fire goes over it with a rush, you can't do any harm. Burn with the wind.

Mr. Scott—What is the object of replowing in the spring?

Mr. Herbst—Why, I always find our soil is worked up a good deal better, broken up more, the manure is better mixed.

Question—Isn't there danger in a dry season of getting a poor stand of plants by plowing in the spring previous to setting?

Mr. Herbst—Why, no, I don't see any reason why. We have always done that.

A Member—Run over your ground with a roller two or three times, as soon as you set your plants; keep running right through with the cultivator, keep the cultivator going.

Mr. Coe—I guess you are a strawberry grower. You don't want your soil compacted.

Mr. Scott—This man is all right, but there are thousands of men who will be a little careless and they would have better results with the fall plowing.

Mr. Hill—If I plowed in the fall, I would plow in the spring, too.

Mr. Coe—If I did, I would plow early, so as to get the soil in proper shape.

Mr. Hill—I would put strawberries in just the same as if I didn't have it plowed. From the standpoint of the farmer, I want to say I find from experience you should have at least a bushel of strawberries for every member of the family.

Mr. Coe—Why, I want more than that.

Mr. Hill—That will do to begin on.

Mr. Goodrich—Some farmers say they can buy them cheaper than they can raise them.

Mr. Coe—They can, too, because they will only buy two quarts for the whole year.

Mr. Goodrich—If you have your bed plowed in the fall, and manured in the fall, would you advise plowing it in the spring?

Mr. Herbst—I would if the manure is thoroughly well rotted.

Mr. Hill—Just a word of warning. It is not sufficient for a farmer to go to a neighbor and get plants to make a new bed with out of an old strawberry bed.

Mr. Scott—It is bad for the neighbor, too.

Mr. Hill—I have had the best results in setting out a new strawberry bed by sending off to some grower and buying new plants every time. I have known of plenty of people going to the neighbors until they finally had no strawberries.

Question—How long do you let your beds stand?

Mr. Herbst—We fruit ours two years. Of course, that is on a large scale. For the farmer, it is as well to set out a bed every year.

Mr. Coe—Even then I think it is wise for him to plant half as many each year, so that he has a one-year old and a two-year old bed.

Mr. Herbst—Yes, then he has something to fall back on.

Mr. Coe—We find a good many years the old bed will give us the best results, then the next year it will be the other way, and if we have one of each, we are always safe and the two-year old bed will always give us berries.

# BUSH FRUITS.

**D. C. CONVERSE, Ft. Atkinson, Wis.**

Mr. Converse.

"There isn't more than one farmer in a hundred that has all the small fruit his family will use" said a prominent man the other day who has traveled extensively over the state and seen conditions about the homes as they are. If the above statement is true, why is it that the other ninety-nine per cent. are living along and depriving themselves and their families of an abundance of the easily raised small fruits, such as the red and black raspberry, the currant and gooseberry? Most men see the desirability of these things, but fail to see that their family is entitled to as much consideration in their diet as is given by progressive farmers to the cow and the hog. Others do not make the effort because they regard the work in the garden as too puttering and not worthy of their attention; others because they think the work of the garden should be done entirely by the wife, as was evidenced by a man who said "I don't want to put out any fruit; my wife is dead and I have no one to tend it."

But let us briefly consider how nearly every farmer can have a steady supply of fresh fruit for the table from the time the strawberry crop is over, about July 1st, to well into September, as well as a supply for jellies, canning, etc., for use till fruit comes again.

Three things are necessary to a liberal supply of fruit; a desire for, a willingness to expend a few dollars for plants, and a determination to have the table supplied with the good things of life. Don't go to your neighbor to get old raspberry or currant brush to split up, because you can get them for nothing, but remember that when using these old plants whose vitality is largely gone your work and the use of your land is largely wasted. Always use young, thrifty plants of all the bush fruits.

## Where to Plant.

Plan to have your fruit garden on as good land as possible, that is near the house and that is well drained. The soil should be thoroughly plowed and pulverized and the plants of all the bush fruits planted in the spring as early as possible, planted in rows seven feet apart and three to four feet in the row. Plant in long rows that the work may be done as largely as possible with the horse. While commercially nearly all the bush fruits can be planted in rows each way, on the farm the strip would be so narrow that it would not be practicable.

### What Shall We Plant to Make a Good Fruit Garden?

You may think that the following list is too large for the ordinary sized family. It may be, but the American people do not like to be scrimped, and then President Roosevelt has put his approval on large families. This will fit any. Let us suppose we have a strip of land available about three hundred feet long. In the first row we will plant for currants twelve Red Dutch, twelve Victoria, twelve White Grape; and for gooseberries twelve Downing, twelve Houghton, planting five feet apart. In the second row we will plant red raspberries and as they can be planted closely we can use one hundred bushes three feet apart. A good assortment will be twenty-five Turner, twenty-five Loudon for bright red, and fifty Columbian for dark red. In the next row for black raspberries we want some early and late, so will put in twenty-five Palmer, twenty-five Ohio, twenty-five Older and twenty-five Gregg, planting three feet apart.

Though blackberries are uncertain of late, owing to our extremely dry seasons, if they do succeed they will extend the season of fresh fruits three or four weeks and so we will try a row of them, putting in fifty Snyder and fifty Stone's Hardy.

While grapes are not, strictly speaking, a bush fruit, they are so desirable that we will add to our fruit garden a row of them, using about ten Concord, ten Worden for black, eight Brighton and five Delaware for red and two Niagara and two Moore's Diamond for white, planting eight feet apart in the row.

Why plant so many varieties of the various fruits? Because they take no more room, the assortment is surer to give a steady daily supply, and of the pleasure that comes from seeing the different kinds growing and maturing. In order to know your kinds and to get the most satisfaction from your effort, make a plat and know where each and every kind is. By so doing if any variety does not please, you will know which to cut out, and those varieties that do please can be increased. While the above by no means include all the good varieties, they do include many of the ones that give results. Our rows being seven feet apart, we can plant a row of potatoes or beans between and all through the first season we can work our fruit garden with a sulky cultivator as easily as so much corn.

### Care of Currants and Gooseberries.

For the first two or three years no work in the way of trimming is necessary with the currants and gooseberries. As they thicken up it is well to have an ideal bush in mind and to have the bushes come as near to that ideal as possible. We may differ in what constitutes an ideal bush, but one on which some five or six bearing canes are steadily kept up is one that will give good results. This can be easily attained by cutting out the new canes each fall and leaving only enough of the best to keep up our ideal number of good, thrifty bearing canes.

For the currant worm nothing is surer to destroy them than Paris Green, used in solution, about the quantity being used as for potatoes. This should be put on as soon as the work of the worm is seen near the base of the bush.

### The Raspberries.

The bright red raspberries, which are the sucker varieties, need but little pruning for the first summer or any succeeding summer. The dark red raspberry, such as Columbian, and all blacks should be nipped the first season when the new cane gets to a height of twelve to fifteen inches. This makes the cane stocky and gives a larger amount of bearing wood and in these varieties we can expect a good crop the next year after planting. The second and succeeding seasons the new growth will be stronger and when the canes are from thirty to thirty-six inches high nip the ends, with the idea of keeping canes low, branched and so stocky that they will stand without the necessity of staking or otherwise supporting.

Cultivation should be continued till well towards fall and if new plants of the tip varieties are desired the tips should be put in in August or the first of September. After picking, old canes should be cut out and burned and the branches of the new growth left alone till spring, even if they grow out four or five feet. When spring fairly opens, go over the bushes and cut laterals back to ten to twelve inches, leaving each cane standing sturdily like a well balanced tree.

### Blackberries.

The blackberry should be treated in much the same way as the black raspberry, as to nipping, trimming, etc., and a heavy mulch of coarse barnyard manure applied in the row will aid greatly in maturing crop of fruit and causing strong growth of new canes. In fact this mulch will greatly benefit all the bush fruits.

### Winter Protection.

Shall we lay our bushes down in fall or not? Without any question the currant and gooseberry need never be put down. With the raspberry, when a good, thrifty growth is kept up and the wood well ripened in the growing season, I believe as good results follow without laying down and in many cases better. Often the destruction of the cane is attributed to winter-killing when they are nearly dead in the fall. Under such conditions the best of winter protection will not insure a crop. Should it be found necessary to protect the canes they can be easily laid down by loosening the soil on the side of the bush toward which it is to be bent and carefully bending over and covering the end with enough earth to hold the bush down. All hills should be bent lengthwise of the row and all the same way. Then after the ground freezes, go through with a sleigh and cover remainder of canes with straw or coarse barnyard manure.

### The Grape.

Time will not allow much reference to the grape. However, they do need to be laid down and protected, to be tied up to a stake or trellis in the spring and can be trimmed by any intelligent person who remembers when trimming in the fall that his fruit must come from spurs of the present season's growth and so trim as to leave two or three buds on a spur.

### Results.

A few less bushels of corn or oats, but the farm is made more homelike, is supplied with the comforts, and luxuries, if you please, of the table, life is broader and the old farm has produced a taste in the children which will be seen and carried out in their own homes soon to be formed, not only in the small fruit garden but in the flowers, shrubs and trees that make the farm home what it ought to be—the brightest spot on earth.

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## DISCUSSION.

Mr. Goodrich—One would suppose, from hearing all these fruit men talk, that about all that was necessary to make everybody happy was for every farmer to raise all the fruit he can, but I want to say this, there are two sides to this question, and I want to give a very short version of the other side. I was down to the city of Oconomowoc once, riding out in the country with a man with whom I was doing business, and while we were talking he turned suddenly to me and said: "You are one of these Farmers' Institute men, ain't you?" I said, "Yes, I have done something in that line." "Well," he said, "I don't think much of these Farmers' Institutes." "Why?

They don't do anybody any hurt." "It did me lots of hurt," he says. "Why, how is that?" "Why," he says, "I was a fruit grower, I raised berries, and I used to sell them in the city of Oconomowoc and I got fifteen cents a quart for all that I could raise, but the farmers' Institute came along here, and there was Herbst and Coe and Thayer and a lot of others, and they told these people that they could just as well raise their own fruit as not, so they all went to work and in every garden and every vacant lot, they are raising berries, so I can't sell any for over six or eight cents a quart. No, I don't like your Farmers' Institute, it has ruined my business."

Question—What variety of currants do you recommend for this section of the country?

Mr. Converse—Those that I mentioned are all good, the Red Dutch, Victoria, and the White Grape. They will surely give you good results and there are several other kinds that are good.

Question—Is not the Victoria easier to keep in condition than the Red Dutch?

Mr. Converse—Yes.

Question—How many canes do you allow in a hill for raspberries?

Mr. Converse—I think four or five is sufficient; they don't generally grow more than that while in their most productive condition.

Mr. Brighton—Not until the bed gets too old. How do you keep the rabbits from eating your blackberry bushes?

Mr. Matteson—Get a license and shoot the rabbits.

A Member—Lay down bush and cover it with dirt.

Mr. Brighton—The bushes were as big around as your thumb and we had snow eight and ten inches deep, and the rabbits would run along on top of the snow and eat them off.

Mr. Hill—If the bushes were like ours, they would have sore mouths when they got through. I tried planting Ohio black raspberries on my place and they didn't do well. I find Kansas is better on my soil.

Mr. Matteson—They won't stand the drought with me.

Mr. Convey—How early in the spring should one commence to cultivate gooseberries?

Mr. Converse—As soon as the ground is in condition, the same as any other crop.

A Member—I can't raise currants, they are the most expensive fruit I try to raise. I have some bushes that I have had three years and I haven't had one currant.

Mr. Converse—Try some of the other varieties.

The Member—My soil is sandy and they don't seem to bear. One thing is the late frosts catch them when they are in bloom. I cultivate or fertilize them and the frost comes just as regularly as my currants come in bloom.

Mr. Coe—Mr. Converse mentioned the Red Dutch, the Victoria and the White Grape. I believe that is as good an assortment as you can get. The Dutch is the best in quality that I know of.

Question—Would you advise against plowing in the fall between rows?

Mr. Converse—It is not necessary to do anything more than to give good thorough cultivation.

A Member—Can you do anything to help this man whose bushes blossom too early in the season?

Mr. Converse—It may be on account of the location of his currant patch. I should put them up on higher ground. There is no question but what you can grow the currant as cheaply as any fruit there is grown.

A Member—Where I live, in Fond du Lac county, we are troubled the same way, they get in bloom and are caught by the frost. Is there any way to prevent their coming out so early?

Mr. Convey—Currants are successfully grown in Alaska. I wonder if they have generally come from further north.

A Member—I have raised currants in

Fond du Lac county and never had this trouble.

Mr. Thompson—On light soil, currants will come out very early in the season. If we would put currants on the coldest, dampest soil that we have, I think we can grow them all right. If this gentleman will put them on his coldest land, they won't come out so early.

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# PLUMS.

**C. E. MATTESON, Pewaukee, Wis.**

The raising of plums in Wisconsin has not met with as great success as it really should have, for I fully believe that there is little if any part of our state but where plums can be grown in any quantity desired and a crop every year, so that instead of being a luxury they can be had as an everyday fruit. In fact, my claim is that plums are the most hardy tree fruit we have and the most reliable. I would have you understand that I am speaking of and recommending our native plums entirely.

### Varieties to be Avoided.

The one thing that has caused so much disappointment and discouragement among our farmers and others who have set out plum trees is that they have set out too largely of the European and Japanese varieties, which experience has taught me cannot be relied upon to any degree of certainty to survive any great length of time the cold, rigorous winters we have here in Wisconsin. Of course our tree sharks will tell us to a certainty that those showing up so nicely on their plate books are just the ones for us to set out, but after trying them we are sadly disappinted; we sometimes get one or two crops, and that usually ends it. I can only recommend such varieties as I have tried, I know there are others that are equally good, viz. Rockford, Hawkeye and De Sota, which ripen in the order named. These will ripen about ten days apart, thus extending the season over a period of about thirty days. The De Sota is probably the best bearer of any of the three named and is a most delicious fruit, but it is more subject to the ravages of the plum curculio.

### Planting.

I recommend planting in orchard style, from twelve to sixteen feet apart each way in the row, and the interspersing of the different varieties, so as to be sure of a perfect pollenization. Of course it is conceded that most of our native varieties are self-pollenizers, still I believe it safer to intersperse the different varieties, mainly for that purpose.

### Cultivation of the Orchard.

I practice cultivation entirely. It is probably pretty well understood that a plum tree needs an abundance of moisture, not only to grow its heavy crop of wood, but to ripen its fruit as well, and that this moisture is best maintained by good, thorough cultivation. I commence this cultivation just as soon as the trees are set out and continue the entire season and every season thereafter.

I believe this thorough cultivation to be one of the secrets of my success and one of the reasons why I have been able to harvest and market a full crop of plums each year since the second year my plum orchard was set out. Of course they only gave me a light crop the second year, but for the size and age of the trees, they have never failed to furnish me a good crop each year, hence my reasons for being so enthusiastic for our native plums and for thorough cultivation. We do not cultivate after the harvesting of the fruit, for we want the wood from that time on to get in a ripe condition for the winter.

### Pruning and Thinning Out.

Probably one of the greatest faults with most all varieties of native plums is their certainty to overbear, so we not only have to resort to vigorous pruning, but to thinning out as well. Most plum trees are liable to throw out great long, overgrown branches each season. These we always cut back from one-half to two-thirds and some of them we take out entirely. A plum tree is somewhat like a grape vine, inasmuch as there is but little danger of over-pruning.

We aim to thin out at least three times each season. First, just as soon as the fruit is pruned nicely we go over and take out about one-third of the fruit from all of the heaviest loaded branches, thus evening up the crop of fruit on all the different parts of the tree, so that the plums will be of as uniform size as possible, and also by getting these off at that age the trees are more liable to retain their full vigor to mature the remaining fruit. Our second thinning is done about six weeks later, or after our little curculio has got in the most of its work, or, in other words, when the stung plums will show themselves better, so we go through and take these all out and aim to thin at this time so that they do not or will not touch each other. Then just before ripening we go through and take out everything that we think is not going to ripen into salable fruit.

Native plum orchard in full bloom on poultry and fruit farm of C. E. Matteson.

Some recommend only thinning out once and to thoroughly sort after harvesting, but there are two objections to this practice. One is that the tree is taxed in growing fruit that never reaches the market: the other is that you are sure to jam them more or less with so much handling. I aim to handle just as little as possible.

### Plums Profitable Fruit to Grow.

Do not be afraid to plant a few more trees than just what you wish for your own use. There is an ever ready demand for them and I am always able to get more for plums than what I can buy choice peaches for and have never been able to supply the demand.

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## DISCUSSION.

Mr. Coe—A gentleman here has brought in seven varieties of plums grown in this neighborhood. They evidently thrive here all right.

Question—Who do you refer to when you speak of "tree sharks" in your neighborhood?

Mr. Matteson—Anybody that will come around and try to make us buy something that will not grow in our locality.

Mr. Stiles—Do you need any special kind of soil for plums?

Mr. Matteson—Our soil is limestone, clay soil, heavy soil. That is all I can speak of.

Question—What exposure do you prefer?

Mr. Matteson—Mine is south-west exposure, but I think it is claimed by the majority of people that they will do better on a northern slope; they claim they are liable to blossom too early and be overtaken later on by the frost if they are on a south or southeast slope. I think there is very little danger of that with the plum. My plums were in full bloom at the time of the heavy snow storm about the 10th of May last year, but we had no loss, we had a full crop of plums.

Mr. Stiles—Do you spray your plums when they are in blossom?

Mr. Matteson—No, we are not obliged to practice that. We have poultry on every part of our farm and we leave that work to them. If they do bother us and we think there is danger, my nine-year old boy goes around once or twice a week and jars the circulios down and they are left there until the chickens get there and they pick them up.

Question—Do you mulch your plum trees the same as apple trees?

Mr. Matteson—No, sir; we manure slightly each year during the winter time, the poultry scratch the manure all over that is around the trees, and we cultivate it in in the spring. That probably would not be necessary on good, rich ground, but we want to keep the ground as rich as we can.

Question—Do you have your orchard protected any from the wind?

Mr. Matteson—No, I don't and I don't think there is any part of this state that is subjected to the north-west wind worse than we are, but I have had no trouble. I am convinced they will stand any amount of wind. Where the ordinary wild plum crop froze out in that rigorous winter we had without any snow with us, and where the frost went down very deep, it froze out the wild crab and plums, while our little native plums in the orchard went through it all right.

Question—How many plums do you get from a tree?

Mr. Matteson—My trees are about six years old, I have about one hundred and sixty trees and we sold about ninety bushels off those trees. Last year I think I could have harvested more than that if I could have given the trees a full chance, but when I set out my plum orchard, I set out raspberries, not only between the rows, but between the trees, and I have had to prune a little closer, I haven't allowed my trees to spread over as much ground as I would like to.

Mr. Coe—In other words, Mr. Matteson has raised two crops off of the same land, plums and raspberries.

A Member—Yes, and chickens.

Question—How many varieties is it best to have in this orchard?

Mr. Matteson—I have only three, the Rockford, the Hawkeye, and the De Sota. They ripen a few days apart. You can plant as many varieties of the native plums as you are a mind to, they will all do well.

Question—Could a man grow his own seeds from the pit?

Mr. Matteson—My experience is limited in that respect. I have a few trees that just gave me a few plums last year that were grown from the pits and the quality is splendid. Whether you can rely upon them is something I shall have to ask Mr. Coe.

Mr. Coe—Of course you can grow trees. Whether it will pay is another question, because the probabilities are that ninety per cent. will be inferior varieties.

Mr. Matteson—It has not been so with me. I have a dozen or fifteen trees, they did not all bear last year, but those that did bear gave me a splendid quality of fruit. You can easily try it; that is, simply plant the pits late in the fall, cover them with boards, so the chipmunks or anything won't get them, and then uncover them in the spring.

Mr. Herbst—I differ with Mr. Matteson in regard to planting pits. I believe it is the experience of almost every one that out of one hundred trees ninety-nine would not be worth raising, and in the meantime you can buy trees from some nearby nurseryman which are known to be of good variety and well tested. You might plant a hundred and fifty pits and get one or two trees out of them, or you may not get any.

Mr. Matteson—I think it is better to buy your trees.

Question—How did the nurserymen get their varieties?

Mr. Matteson—By selecting the choicest of those they plant from the seed.

Prof. Moore—Could not the average fruit grower bud onto those seedlings, cutting buds from his choice variety of plum trees?

A Member—He can grow plums from the pits, but it would be much wiser to bud or graft these seedlings. They will not grow true to name, or be like what the parent buds were. They are inclined to deteriorate every time, and they would not be good stock to graft on.

Mr. Matteson—I think the budding and propagating should be left largely to the nurseries. I think we can afford to buy our trees, then we are much more sure of what we are going to have.

Mr. Coe—You can have the pleasure of seeing the buds die. I can assure you the farmers have too much to do, they will not sow the pits and bud trees.

Mr. Hill—These native plums are great things to sprout and in some places where they are not cared for they make a regular hedge of plum trees. I understand that you bud onto trees that do not sprout mostly.

Mr. Coe—Oh, no. The best plums are grown on native stocks and the native stocks will sprout, but you can cut it off as easily as you can a bud, so that don't amount to anything.

Mr. Matteson—I want to make one point, and that is, it is my experience that the best stock grows best by being deeply planted. Many of us do not get our trees down deep enough.

Mr. Convey—Where plum trees grow on their own roots, cannot the sprouts be used?

Mr. Coe—Yes, and then you get a good variety.

Mr. Matteson—If you can get a uniform lot of trees that have been grown from the seed, each year, when you happen to lose a tree, you can set in these trees grown from the pit. Of course you could not do that from budded stock or stock that has been grafted. A word in regard to setting these trees out. Be sure not to set them out in clusters, as is often recommended. I have nine trees set out near my house, you might say they are in clusters, and they are heavily mulched and manured, but owing to the dry weather two years ago we got scarcely anything last year; whereas a few rods from there, in my cultivated orchard, I got a full crop. They will do much better where they are cultivated.

Mr. Coe—They will not do well unless you do cultivate them. They will not succeed in grass and weeds, or on poor soil.

Mr. Hill—Cultivate just as shallow as you can and just as fine and you will make a success in growing plums.

Mr. Matteson—Poultry manure I think is one of the best fertilizers to use around plums and to have the poultry there as well. I am sure that is one of the things that helps me to keep down the plum circulio.

A Member—I picked those plums that are exhibited here from Colonel Sabath's place out here, I picked seven varieties, and he has more. They were picked a year ago last fall and have kept very well in the bottles. I am sure every one around here can grow plums, that our soil is all right.

The Institute adjourned till 1:30 p. m.

# AFTERNOON SESSION.

The Institute met at 1:30 p. m., CONDUCTOR H. M. Culbertson in the chair.

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## APPLES.

R. J. COE, Ft. Atkinson, Wis.

Before beginning my talk on apples, I would like to take you back in thought for a moment to the old town of Woburn, Massachusetts, and where still stands the old Rumford House, in which, in the year 1753, Benjamin Thompson, afterward Count Rumford, was born. His parents were poor farmers; he saw from childhood the hardships of the men who tried to get a living from an unwilling soil; he saw him mother (who was left a widow) toiling far beyond her strength, and so, when he grew to manhood, he left the farm and went to Rumford, now Concord, New Hampshire, where he became a teacher. While there he was made Major of Militia by the English governor. This occasioned jealousy among the older officers, and he was charged with disaffection towards the Royal cause. These things drove him from the place and he went back to Woburn, his old home, where he was visited one night by two deserters from the English army. These men he persuaded to return to their posts, he feeling that this was the only honorable thing for him to do. For this he was branded as a traitor and his life sought by his old friends and neighbors. Through the loyalty of one friend, he was warned in time and made his escape to England where he became what he had been falsely accused of being, a Tory, and he returned to America and fought in the Royal cause. He afterward entered the service of the King of Bavaria, where he did a great work for Munich, for which this city erected two fine monuments to his memory. In later life he established a number of schools in England and America, one of these, the Royal Institution of Great Britain, is still run under the same methods and annually bestows the Rumford Medal to inventors, as does also the American Academy of Arts and Sciences, from funds left by him for this purpose.

In the public library grounds at North Woburn stands a statue in bronze, erected to the memory of this wonderful man—Count Rumford. Near the old Rumford House is the old Baldwin estate, where lived the family who were loyal in friendship to young Thompson during his troubles, who warned and assisted him in his flight from the enraged townspeople. It was a descendent of this family who propagated and grew the famous Baldwin apple. A granite monument is standing near the place and on it is carved an apple. This, so far as I know, is the only fruit which has had a monument erected to commemorate its valuable qualities.

### Some "Don'ts" of Apple Growing.

As this subject was on last year's Closing Institute program, I need only outline a few of the points which seem to me to be essential to the successful cultivation of this most valuable fruit. It may be well to mention a few things at first that we ought not to do.

It seems as if about nine-tenths of all who plant apple trees at all make a great effort to give them the most unfavorable conditions possible. If they have a piece of old, tough sod, or an old orchard, or any other place where they cannot cultivate, that is the place where the trees are planted, or at least called planted. Let us describe how it is usually done. A hole about a foot square is dug in the sod and if the roots of the trees are too long to go in the holes they are doubled up and crowded down and the hole filled up with the sods and soil mixed and the tree called planted. And when this tree fails to grow they say: "Oh, well, you can't grow apples in Wisconsin anyway," which is true if they have this kind of care.

Let us give a thorough preparation of the soil, always selecting the best site at our command.

### Ideal Site for Orchard.

The ideal site, I take it, is a north or north-east slope. If we do not have this, let us get as near it as we can. If we have to plant on a level, well and good. If we have nothing but a south slope, then plant there. Plant a few trees anyway.

### Directions for Planting.

Now, I realize that we are not in the most favored locality for apple growing and so much more the necessity of giving good care and I firmly believe that if we do give good care we can grow paying crops. At any rate, many are doing so now and many more can do so and all of us can grow some. So then let us do our best and give the trees a chance. Let us plow and fit the land as well as we would for any other crop, and when we are ready to plant the trees dig a hole broad enough for the roots to have plenty of room to be spread out in a natural position and deep enough to put plenty of good, rich top soil in the bottom in which to plant them. The trees as dug have the roots mangled more or less in the digging. so that the ends are not smooth and clean cut. Now take a tree and prune off the end of each root, cutting from the lower side back to the sound wood, leaving a nice, smooth cut surface. This enables the wound to heal quickly and to form new roots for the future growth of the tree.

Place the tree in this nicely prepared bed we have taken so much pains with, so that it is about three inches deeper than it stood in the nursery. Then putting in a quantity of soil, work the tree up and down a little so as to work the soil all around the roots. This will raise the tree about an inch deeper than it was in the nursery row. Now be sure that every root is packed firmly in the soil, so there will be no space for the air to get in and dry out the roots, and so that all the roots shall be in close contact with moist soil, so they may be able to take up water to supply the needs of the tree. As soon as the tree is planted, take a garden rake and smooth off all around it. This puts the surface of the soil in the right condition to hold moisture for the use of the tree.

### Care of Young Trees.

Now we have our tree planted, what shall we do with it? Those of us who have planted it in the sod as above described are very likely to keep as far away from it as possible, while those who have taken the pains to properly prepare the land to plant the tree are anxious to make it grow.

We all of us know that all our farm crops need cultivation to make them grow well and it is just as certain that our trees need good cultivation as much as does any other crop. For the first year or two some crop that we want to cultivate, such as corn, early potatoes, or beans, may be grown in the orchard without any injury to the trees. Cold rarely kills our trees, but heat and drought do. The hot sunshine of early spring, warming up and starting the sap on the south-west side of the tree, and then the sudden cold of night, is very injurious. We have all seen the bark on the south-west side of our trees die and get loose, then the borers get in and soon the tree is ruined. Then, too, when the hot, dry weather of summer comes, if the trees are not cultivated, they suffer greatly from lack of moisture. I believe our trees should be cultivated the same as any other crop. The cultivation should be continued up to, say, about the first of July and after that I am of the opinion that some crop should be sown to cover the ground and give the tree a chance to ripen up and also to protect the roots during the winter. The trees should be protected as soon as planted and I have found a handful of straight rye straw, stood up around the body of the tree and tied loosely with three strings, a good protection. If wool twine is used for this purpose, it will last for two years and then another protection of the same kind can be put on in about two minutes to the tree. This keeps off the rabbits and mice and sun scald and keeps out the borers, in other words, protects the tree, which is more than can be said of some kinds of protectors. By taking these few precautions we may have at least fairly healthy trees and all the apples we can use, as well as a few for our friends.

## DISCUSSION.

Mr. Convey—What is your opinion on the subject of mulching fruit trees, Mr. Coe?

Mr. Coe—That question was asked during the discussion of the bush fruits, whether we should apply mulch to the surface of the soil and hold back the growth of the plant. I realize that a good many people have an idea that by mulching the soil beneath our trees we can hold them back and make them blossom very much later in the season. I believe that to be a mistake. The tree will start to leaf out and grow a blossom, when the weather comes right, whether the ground is covered or not. In other words, as soon as the warm weather comes our trees start to grow, growing first from the plant food, the starch that is stored up in the body of the tree. So it is doubtful in my mind whether we can put anything on the soil to hold back the growth of the tree. If we could hold the roots of the tree frozen long enough so that it would use up all the plant food in the tree, it would die. It takes the plant food that is stored up in the tree to make the first growth of the tree. When the tree first leaves out, the leaves come from the plant food stored in the body of the tree, and if we can keep the root dormant long enough to use up all this plant food the tree suffers.

Mr. Herbst—What aged tree would you prefer to set, and name us three early and three late varieties for farmers to put out.

Mr. Coe—Well, a good three-year old tree I consider old enough, and I should want that tree pretty well grown, not a little, scrubby tree, and I wouldn't care to have it much, if any, older than that. I believe the ordinary farmer will have better success with planting a tree of that age than much younger. This question of varieties is a pretty hard question to answer, because I realize that this Bulletin goes all over the state and some other states, and while a certain variety might do well with us, it might not do so well in other sections. I will name first, for the early varieties, Yellow Transparent; it comes very early, yields every year, and gives us a nice lot of good fruit. This should be followed by the Red Astrachan and the Duchess. For the three fall varieties I would name the Fameuse or Snow, the Wealthy and the McMahon. For three winter apples, the Northwestern Greening, and I would put in there one that is not so well known, the Windsor Chief, a splendid apple and long keeper. The Tallman Sweet for a good winter, sweet variety.

Mr. Matteson—It is claimed by some of our eastern friends that trees started in the east will do better in this locality. What do you think about that?

Mr. Coe—I don't know why they should do better. I see no very serious objection to planting eastern trees, so far as the tree itself goes, only in this way. The people who come from the east to sell trees in Wisconsin do not sell trees adapted to our climate. In other words, they sell Rhode Island Greenings and Baldwins and Northern Spies, and others of that kind, and when we go to fairs we do not see those varieties on exhibition. I have here three varieties that happen to be on the table. There is the Pewaukee, which originated over at Pewaukee.

Supt. McKerrow—That is the reason it is good.

Mr. Coe—For the lake shore, that is a good apple. There is another Wisconsin apple, this is a Small Wolf River. Here we have two or three samples of the old Ben Davis. They are poor enough.

Supt. McKerrow—They are about as hardy and as good as pumpkins.

Mr. Coe—Oh, they are hardier than pumpkins.

Supt. McKerrow—Not quite so good.

Mr. Goodrich—If you haven't any other, it is a pretty good apple.

Mr. Stiles—How about cultivating in your orchard? Isn't that better than mulching for a number of years?

Mr. Coe—Yes, I believe our orchards should receive thorough cultivation. There is nothing in the world to preserve moisture like good surface cultivation, which is what we lack in this country. I think we should cultivate some every year, although the time may come when our trees are growing and it would be well to stop for a year or two perhaps.

Prof. Moore—Couldn't you plant a crop and cultivate in that way?

Mr. Coe—We can plant corn, or early potatoes, or beans, anything of that sort. I wouldn't want to plant late potatoes, because the digging of late potatoes would be equivalent to another cultivation and we do not want to cultivate much late in the season.

Mr. Scott—How about using a plow in the orchard?

Mr. Coe—If you start with a plow, you may plow every year.

Mr. Scott—How deep?

Mr. Coe—Well, trees as usually grown, the roots are about six inches deep. You wouldn't want to plow deep enough to strike the roots, if you did there would be sprouts coming up and it would be an injury to the trees, but if you cultivate every year and give good, fair cultivation, the roots will stay down. I would prefer cultivation to plowing.

Mr. Scott—How about pruning trees?

Mr. Coe—It depends on what you are pruning for. For instance, you have an old tree that isn't growing as well as it should be, that kind of a tree should be pruned right now and we will get a better wood growth. On the other hand, if we have a young tree that is growing too rapidly, in other words, making wood instead of fruit, then we want to prune it when the tree is growing rapidly, say in June, checking the growth of the tree so as to make the plant food developing there go into the fruit buds and give us a better crop next year.

Question—Is it better to prune a tree while it is growing?

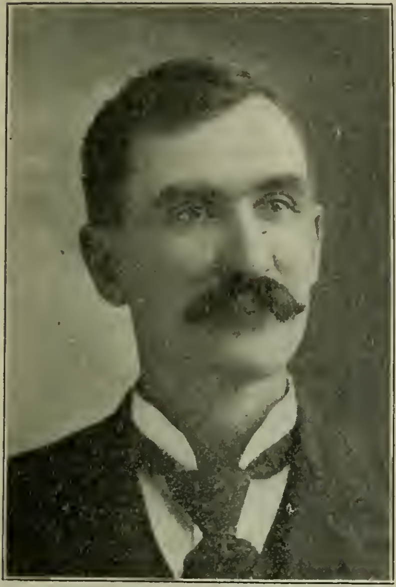
Mr. Coe—When it is growing, if you want to bring it into fruiting, then the buds will be set for the coming year.

Question—Is spraying necessary or profitable?

Mr. Coe—Both necessary and profitable.

# ROOTS FOR LIVE STOCK.

E. A. CROMAN, Grass Lake, Michigan.



Mr. Croman.

The stock feeders of the United States have come to understand that to have their live stock do their best they must have a ration each day of some kind of succulent food. The dairyman probably realizes this more than the beef feeder. Our horses, sheep and swine need this succulent ration as much as do the beef and dairy animals.

There are three ways that this ration can be obtained: the silo, the root crop, and by the use of beet pulp. The silo, I believe, today solves the problem for this succulent ration, as we can furnish a cheaper succulent ration than by the growing of the root. In the past we have grown enough roots to furnish a ration once a day to all kinds of live stock kept on the farm, and from the method we pursued in taking care of our corn crop and feeding it with the root crop, I believe we got about as good results as by feeding ensilage; but we did not do it nearly so cheaply. As regards this succulent ration, we find men who are not situated so they can feed silage. To these men I say, raise a crop of roots. But I hear some say that they do not care to raise a crop that contains eighty or ninety per cent. water. There is a feeding value in this moisture which the chemical analysis fails to find. Take for instance our summer pasture,—the most perfect balanced ration we have, and yet it has about the same amount of moisture as has the root crop. It is not the immediate nutrients found in these succulent crops which are of so much value to us, but it is their aid in helping digest and assimilating the large quantities of dry matter eaten. They act as an appetizer and also as a laxative, they keep the digestive organs in good working order. I believe they increase the nutritive value of the dry rations from ten to fifteen per cent. and enable the animal to consume at least twenty per cent. more dry rations, such as clover hay, oat and pea hay, corn stover and the dry grain ration that may be fed.

### Selecting the Seed.

This should be done early in the season, in fact, early enough to admit of a good, thorough test. Oftentimes the seed will not germinate more than ten to twenty per cent. This kind of seed you do not want to buy or sow. You can oftentimes tell poor seed without testing. Seed that is musty, caused by becoming heated, is not good seed to buy or sow. Your seedsman will let you have a sufficient quantity for testing, for it is of as much interest to him as it is to you. Many a failure in growing a successful crop of roots may be traced to poor seed, so I say, always test your seed.

### Amount of Seed Required Per Acre.

Seed that will germinate eighty or ninety per cent., two to three pounds per acre, that is, when you sow in rows thirty inches apart. There is a saving in time and labor by knowing that you have good seed. Seedsmen say it requires six pounds per acre. This is not correct if good seed is sown.

### Harvesting.

We top with hoe, throwing the tops of two rows together. After the whole patch has been topped we draw off the tops and pull with iron harrow. You can pull in this way ten or fifteen acres per day. After the whole field has been pulled, we either throw in piles or draw direct to the cellar or pit. In loading a wagon we use a six tine fork, and in this way we can harvest a crop very rapidly. In thinning the Oxheart carrot, we use a four inch blade hoe, thin same as mangles, leaving one plant in each place, pull with harrow and load wagon same as mangles.

### Feeding.

We begin feeding whenever it is necessary. We have begun as early as October first. This was when stabling of the live stock became necessary. In feeding to cattle, we feed the roots whole, throwing root in feed box top towards the animal. We used a slicer for a number of years but found it was not necessary. Amount of roots required at a feeding depends upon the animal, for a one thousand pound cow, from twenty to thirty pounds. In storing, great care should be taken not to leave any dirt on them, as they will not keep so well. In pitting, large vent holes should be left at top of pit, so as to give free vent to the heat that the roots generate caused by the curing process. If you have not a silo, by all means grow roots.

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## DISCUSSION.

Question—Why do you use Golden Tankard instead of the Long Red?

Mr. Croman—The Long Red is a larger root, but if you will notice the top of the root, there is too much crown to it and there is not so much feeding value in the crown of the root as there is in the lower part, and the Golden Tankard is more easily handled. In dragging out the Long Red, you won't do as good a job as with the Golden Tankard, as they stand out of the ground so high, the drag will jump, oftentimes leaving a good many roots and breaking off some of them.

Question—Will the harrow take them all out in this way?

Mr. Croman—It will.

Question—Don't you use the plow at all for plowing out roots?

Mr. Croman—No, sir; the Golden Tankard grows above ground.

Question—How about carrots?

Mr. Croman—The Oxheart carrot grows above ground. That is why we grow those two kinds of roots, because we can harvest them so much easier. We have a heavy harrow; we used to use the old fashioned wooden harrow; now we use the iron harrow.

Mr. Scott—Describe how you handle these roots in the pits.

Mr. Croman—First, we throw our roots on top of the ground, not digging down into the ground, but throwing them in long piles, putting up a ridge pole over them and setting up rails, and covering these rails with straw and dirt. Then we put on manure to keep them from freezing. We put a six-inch tile in the ridge to make a vent hole. If you have five hundred bushels, it is well to have probably three vent holes and run the tile well down into the roots, leaving that entirely open until freezing weather. After they have cured out and it gets down to very cold weather, we close them up.

Mr. Goodrich—How long will they have to lie on the ground to cure?

Mr. Croman—I don't know. We never have left them out very long. Our method has been to commence about the first of November to harvest. It is the most convenient time for us, as we haul direct from the field to the pit.

Mr. Goodrich—If they should lie out there and freeze hard during the night, how would that be?

Mr. Croman—It would hurt the Golden Tankard, all kinds of Tankards freeze, while it doesn't hurt a rutabaga so much.

Mr. Convey—I have heard it stated that the most palatable and digestible portion of the root is that beneath the crown. Have you given that matter any attention?

Mr. Croman—I have not, no.

Mr. Convey—What kind of manure do you use?

Mr. Croman—We never compost any manure. We draw our manure direct from the barn to the lot and spread it as we make it.

Question—How do you top them?

Mr. Croman—With a hoe—topping two rows together, then drive in and throw the tops onto a wagon and drive it off.

Question—You cut off a little of the root with the head?

Mr. Croman—Yes. One beauty of the Tankard is that the crown of the roots is very small, and after one has topped a few roots he will get onto the knack of just skipping them, so they will not take much off.

Mr. Imrie—Would you prefer putting them in pits to putting them in a cellar in the barn?

Mr. Croman—No, sir, I would prefer the cellar, but sometimes we have more roots than we can get into the cellar.

Mr. Imrie—They will cure equally as well in the cellar.

Mr. Croman—Yes, providing you have good ventilation.

Question—What distance do you have them apart in the row?

Mr. Croman—One foot. Now, you understand in sowing the Tankard, there is more than one germ and of course it starts more than one plant, and sometimes you will have two or three coming up; the little fellows will start around the main root. We go through as early as we can, because this is about the time you want to hurry them along.

Question—Do you prefer a large size, a medium size, or a small size root for the actual feeding value?

Mr. Croman—The Golden Tankard does not grow as large as the Long Red or the Medium Long Red; that is why we prefer the Golden Tankard. As far as the feeding value of the root, I don't know that there is very much difference between the small root and the large one. The size does not affect it as much as it does in growing the sugar beet. As far as roots for stock, I like to see them a pretty good size.

Mr. Goodrich—How many tons can you raise to the acre of the Golden Tankard?

Mr. Croman—It is owing to the soil of course, ten to sixteen tons.

Mr. Goodrich—Can you make your supply of roots go further by feeding with bran or something of that kind instead of feeding alone?

Mr. Croman—We feed just about so many pounds a day. It takes from twenty to thirty-five pounds, just about the same quantity as we feed of silage.

Mr. Stiles—Are these roots ready to feed as soon as you dig them?

Mr. Croman—We have fed them before we began to harvest. Sometimes with us we have a drought and the drought generally strikes us about the 15th of July. We have commenced at that time; the tops are fed to the cattle and the hogs.

Question—Do you consider there is

as much feeding value in a ton as in a ton of good corn silage?

Mr. Croman—No, sir, not quite so much. If we were in the root business for feeding stock, we would increase the sugar content of the root. We are not growing very many roots, but we have grown enough to notice this, that by feeding the silage and roots together, we get a little better results than by feeding roots alone or silage alone.

Question—On very heavy clay soil, can you harrow those carrots out?

Mr. Croman—Yes; they grow above ground and they will not break off, they will come out on clay land as well as on sand.

Question—Won't they come to pieces with the harrow?

Mr. Croman—No, sir, they will not. Oftentimes, you would not know but what you had hooked them out.

Question—Wouldn't there be more feeding value if you grew varieties that grow in the ground.

Mr. Croman—Yes, but it would cost more to grow them.

Mr. Scott—What distance apart do you have these Oxheart carrots?

Mr. Croman—Four inches, one plant in a place.

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# BREEDING SWINE.

**L. P. MARTINY, North Freedom, Wis.**

Mr. Martiny.

Every pig breeder should know the points of a good pig, or at all events have an ideal at which he will be aiming.

As to breeds, every farmer will have to be his own judge in this respect and choose whichever breed suits his tastes, his likes or desires and his qualifications. But it matters not which breed we choose, for with all our breeding and feeding, our study of types, families and pedigrees we should keep in mind the common sense hog, or the type of hog that the practical, everyday farmer, who cares more about types than breeds, and more about form than pedigree needs, must have, and in the end will have

We should keep this type of hog in mind, because there are many influences that will lead us in an entirely different direction. To supply the farmer with this kind of a hog is the end of all breeding. It is possible to run to fancy points until the men who emphasize fancy are supplied.

### Good Constitution More Important Than Style.

As a rule, we should not care whether the hog wears red, white, or black hair; whether its ears hang down or stick up; whether it has swirls and cowlicks, or combs its hair straight. What we want first is a hog with a constitution, and any system of breeding, whether in-breeding or out-breeding, whether straight, crooked, or otherwise, that enfeebles the constitution is the kind of breeding that we do not want in our herds. If it be necessary to in-breed or line breed closely for the purpose of developing some particular curl in the tail or smoothness or color of hair, and at the same time weaken the constitution or dwarf the size, that kind of breeding is exceedingly dangerous. Nor do we care much about hogs "bred to the purple." We are not particular whether the grandsire of our pigs was sold for one, two, three, four or five thousand dollars. Our interest is mainly in this question: What number of pounds of live hog can be secured per one hundred pounds of grain fed? In short, we want a hog with a vigorous constitution, he must be a greedy fellow, growthy, vigorous, healthy, and as good a looker as possible.

### Best Type for Breeding Purposes.

In any of the breeds if we select the vigorous, the energetic, the growthy types, and send all others to the feeding pen, it will not be very many generations, or years, until we will have no reason to complain of hogs delicate, lazy, too fine in the bone, too short in the body, or too long in the legs.

Pens which are used for sleeping quarters in winter and farrowing pens in spring; sows and litters in the foreground, on farm of L. P. Martiny.

We admire a good-looking hog, and there is no reason why a reasonable amount of good looks should not go with the hog of the highest usefulness, but neither good looks nor fancy breeding should stand for a moment in the way of the useful type of hog that combines vigor of constitution, a wonderful appetite, growthiness, and reasonably early maturity, with a form pleasing to the eye of either breeder or farmer who has an eye for beauty.

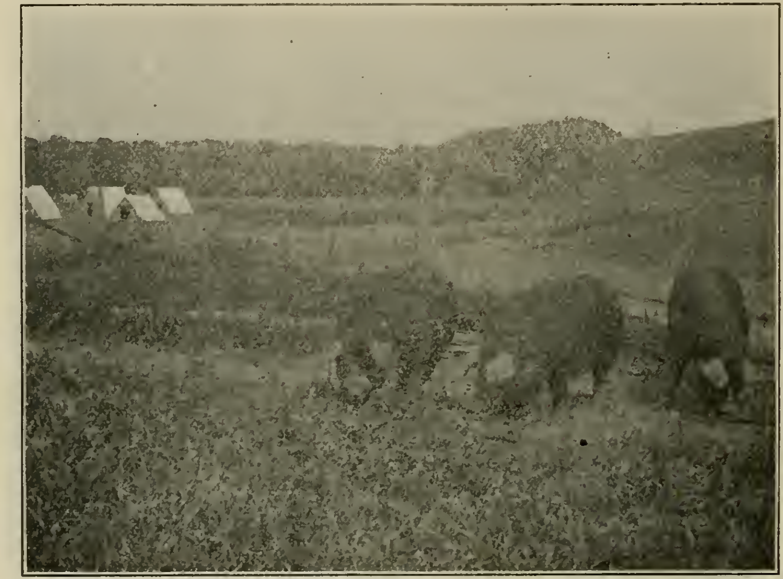
When we come to the final test of beauty, "pretty is as pretty does," the prettiest hog, after all, is the one that is the most profitable and the one that makes the most and best pounds of gain from a hundred pounds of dry matter.

It is pounds and price per pound that the farmer is seeking, and that which will produce the greatest number of pounds of the best quality is the best hog and can never be bought too dearly. When a man starts out to buy a cheap pig, with cheapness the sole end in view, he starts out with an invitation to some one to swindle him.

### Selecting the Sire.

Selecting the boar is a matter of much importance in swine husbandry. The influence of the boar is equal to the combined influence of all the females in the herd, on the supposition that their powers of transmission are just equal to his. But if they are not purely bred they will not have powers of transmission equal to those possessed by the boar. The influence, then, of the boar upon the progeny will be as much greater than the combined influence of the sows as his prepotency exceeds theirs. You can easily see in this case, where we are looking for nearly all of the improvement from the male side, the boar becomes almost the whole herd. Looking at it from this standpoint, and this is the true way to view it, we should never be content with an inferior hog. The important considerations in choosing a boar are such as relate to breeding, form, constitution and masculinity.

Purity of breeding is of great importance, or we cannot be quite sure



Three fall sows which will be candidates for honors in the coming State Fair show rings, on farm of L. P. Martiny.

that the properties which we seek will be transmitted, but with it we can be almost certain of the fact, if the right kind of pedigree is behind our selection, a pedigree in which the immediate ancestors were good individuals and good breeders.

The marks of different breeding are always plainly visible. Watch for a narrow back, a drop behind the shoulders, a short girth around the heart, walking on the dew claws, narrow over shoulders and loin, tucked up ham and flank, a thick, wrinkly skin, and coarse, curly hair.

The form which the boar should have will, of course, be modified by the breed, but there are certain essentials of form which all boars should have, whatever the breed. They should be strong built and yet without coarseness. The neck and body should be short for the breed and the legs short rather than long. A fine external form is only the result of a superior internal organism.

There are a few points that all hogs should have, and these are so important that they should not be overlooked, as width between the fore legs and large girth behind them, denoting large, active heart and lungs, the very foundation of an animal; straight, strong, clean limbs, with feet erect, denoting solidity, and firmness of framework; smooth, mellow skin, covered with fine, soft hair, denoting good digestion and good health; short, thick neck, and well-sprung ribs, showing that vitality and power of assimilation which are necessary in every meat-producing animal; the short, concave face and slightly drooping ear, sure signs of an easy keeper and a quiet disposition. These are some of the features that should be demanded in the male hog, not merely for the sake of appearance, but because they indicate qualities of real value.

The evidences of masculinity are strength of development in certain parts of the body, as, for instance, the head, the neck, the shoulder, the bone and the hair. Where these features are absent we have to look out for two things; the first of these is lack of constitution, and the second lack of prepotency. Even though the male should have large development, the lack of masculinity should be considered a serious defect.

It is important that the boar should be chosen, in some measure, with reference to the females with which he is to be bred. It is always interesting to note the faults in the dam that may be corrected, or at least modified in the off-spring, by skillful selection in the male. If the female is too light in the ham or shoulder, the male should be especially good there. If she is sharp-backed and slab-sided, the male should be board-backed, with well-sprung ribs. If she is long-nosed and coarse about the head, the male should have a short, broad, concave face, with fine ear and heavy jowl. If she is too coarse, too leggy, too active, too lazy, too anything, the opposite should be prominent in the male to which she is to be bred. It is one of the laws of nature that opposites have an attraction for each other. When the selection and mating is done by man, he should be guided to some extent by her teachings in this respect.

### The Brood Sow.

In the selection of the brood sow we should have the same ideal in mind as when choosing the male, only note the following points of difference. She is not so large in frame; is finer in the bone and hair; is finer in the head and neck; is more roomy in the coupling, and she should have not less than twelve teats placed well apart.

We may select a sow and she may prove to be a disappointment. Often it is so when a farmer first begins to go in for a system of breeding and selection, not knowing the heredity of former ancestors. You must have good stock to begin with; unless you have a good sow there will always be trouble. The evil results of an inferior sow can be seen in the first litter and this class of animals should be gotten rid of at once. Much of the success of a sow depends, in addition to her breeding, upon the feed and care that have been given to her while young.

Bunch of March and April pigs; photo taken July 1st. Pigs feeding in rape pasture on farm of L. P. Martiny.

### How to Improve the Herd.

Farmers are constantly complaining that their hogs become too fine-boned and get but temporary relief by buying coarse-boned sires. These facts show that, as now handled on the average farm, the hog is in an abnormal condition and that degeneration is constantly going on, or, as they say, "our stock is running out."

With proper care and feed, the form, size, substance and bone can be well maintained and even improved upon. This is proven by the fact that careful, intelligent breeders and specialists hold their stock up to a high standard of excellence and ever improve it. Nor is it difficult for the intelligent farmer to keep his stock up to this standard. First of all, there must be a careful discrimination in the way of care and food between the hogs used for breeders and those intended only for feeders. Breeding from immature stock must be avoided as much as possible, for this is probably one of the greatest sources of the present lack of constitution. To fatten brood sows after they have farrowed one or two litters is a practice altogether too common. Good mothers should be held for breeders as long as possible.

The variations found in our litters give us a choice of selection that enables us to select those that are most apt to be good breeders and good milkers.

### Pointers for Buyers.

In conclusion I would like to give a few pointers on buying breeding stock. The buyer should know exactly what he requires and write to some reliable breeder of pure-bred pigs, stating what points are desired and those that would be most objectionable. He will see that you understand your business and that will cause him to take a pride in his reputation and fill your order to the best of his ability. Do not have an ideal color and sacrifice everything else for color. Never confine yourself to a fancy color or ear when ordering a pig.

## DISCUSSION.

Mr. Rietbrock—You say to keep a brood sow as long as possible. How long is that profitable? What is the average age to which they can be kept?

Mr. Martiny—I have heard of their being kept until over ten years old. We have some that are six years old, but as to the average age, I would put it at about three years, because some of them we turn off after their first litter.

Mr. Stiles—You say to pay no attention to the color. If a man is breeding a Poland China, would you advise him to get a white one?

Mr. Martiny—No, but don't confine yourself to the fancy markings so much. If a pig has an occasional spot, I wouldn't condemn it on that ground.

Mr. Thompson—If you went out to get a hog to head your herd, you would want one with all the good markings.

Mr. Martiny—Of course, I am a breeder and I want that, but for a man who is only making pork, he doesn't need to be so particular. A small white spot doesn't hurt a Poland China. In breeding pure breeds you have to make a discrimination to quite an extent, but for a man that is just producing pork, that doesn't count for anything.

Question—Can you recommend any particular breed as being profitable?

Mr. Martiny—No, but for anybody raising hogs for pork I wouldn't go outside of the Poland China, Jersey Reds, Berkshire or Chester Whites, those are the four best breeds.

Question—How about the Duroc Jersey?

Mr. Martiny—That is the same as the Jersey Red.

Mr. Convey—Do you attach much importance to early maturity?

Mr. Martiny—Yes, I want a hog that is reasonably early matured, but I do do not want them so early matured that they do not get size and lack constitution.

Mr. Convey—Is it advisable to keep ground oats for brood sows?

Mr. Martiny—Yes, that is good feed. That comes up later.

Mr. Goodrich.—Wouldn't you just as soon feed oats whole?

Mr. Martiny—Yes, that is the way we feed oats to our brood sows.

# HOUSING AND CARE OF SWINE.

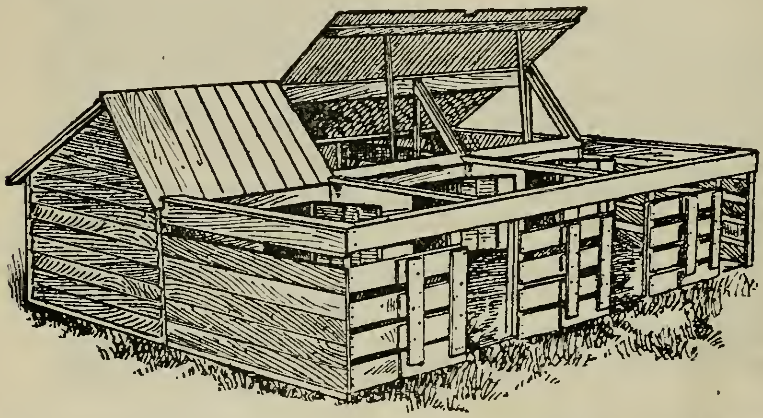
**JAS. FISHER, Eastman, Wis.**

The subject of proper housing for hogs has been sadly neglected by most farmers and breeders, to their own disadvantage. On many farms the hogs, both young and old, are obliged to seek their shelter around straw stacks, or under buildings, through neglect of owner, or on the pretense than when he became able he would build a suitable hog house. Neglect is a slow road over which to accomplish much.

The question which confronts you is, can you afford to annually lose so many pigs for the want of suitable shelter for your hogs. I am still firm in my belief, as I have often asserted, that the profits derived from the hog here in Wisconsin could be double if proper shelter and care were used. The old saying that an animal well bedded is half fed applies to the hog as well as to any farm animal. But just what kind of a hog house is not a settled thing.

## Sunlight and Ventilation of Most Importance in Hog House.

I believe that most all hog men, at some time in their lives, contemplate the building of a large hog house, for the reason that one sees so many built. A hog house with all up-to-date plans, containing feed, water and bedding, pen, alley and driveways, all under one roof, is fine to think of, but I have never yet seen a hog house built on this plan that gave the owner the profit and the hog the comfort and sanitary conditions that a hog house must have to insure good health. Let me tell you that sunlight and ventilation are far more profitable than one of these fancy hog houses, built for the owner's convenience instead of the hog's comfort and health. The hog house with low ceiling and double row of pens is generally damp and foul smelling. Getting sunlight into the sleeping rooms and feeding places is,



Breeding pen used by Mr. Fisher, holding three broodsows. House 18 x 6. Feeding floor 12 x 18. Movable partitions.

in my estimation, the first thing to think of.

I should say to those contemplating building hog houses, do not wait any longer, for you can build a cheap one, if necessary. A hog house should be constructed so the hogs can be fed away from the nest. I will speak later about suitable farrowing pens and accommodations, as I deem them of the most use to you.

I like the feeding floor outside where the sunlight can get at it, surrounded by a tight fence of upright boards, three and one-half feet high, as it affords a shelter from the cold winds. We hear much about sunlight and ventilation in our stables and it is just as essential in our hog pens. Shut out sunlight and fresh air and there is no feeder so skilled in feeding or compounding a ration that will give you results that can be had from fresh air and sunlight accompanying this ration.

As we travel through the country, how often do we see buildings without the proper ventilation and opening for sunlight. You all know the pale, sickly plant grown in a dark cellar and the strong, lusty plant grown in the open air.

I have dwelt longer, perhaps, than I should have on this subject of sunshine in a hog house, but these things become a necessity and cost nothing, and the lack of proper ventilation and sunshine is the main cause of so many swine diseases.

### A Convenient Hog House.

I have tried many hog houses and have found the one I will try to describe to you the best and most convenient I now have on the farm.

We built a floor, putting a good foundation under it, forty-eight by sixteen feet, facing the south, then on the back half of this we built the hog pens, or rather the farrowing pens. These we made four feet high, all walls double boards with paper between. Two-thirds of the roof is shingled, the south third is made up of doors opposite each pen, so that when open the direct rays of the sun enter every bit of the house. The pens are six by eight feet. When partitioned, this will make a pen that will hold eight sows. The front pens are the same size and they are also partitioned the same as the house. These we use for feeding. We also make a slope to the floor for proper drainage and a good fender eight inches from floor and eight inches from wall, to protect sow from laying on pigs. Opposite each feeding place is a double door, small door at bottom to be open to let little pigs out on feeding floor so they may take proper exercise and be fed away from sow a little extra. The single pen system is good, if built so sunlight can enter, but it requires more work at feeding time if raising many pigs.

In the time alloted to me, you cannot expect me to touch on anything but the important details. One cannot ever expect to succeed unless he gives the proper care and I will speak to you on the care of the brood sows, because so much depends on them for your future crop of pigs.

### Care of Brood Sows.

I believe one of the faults of most farmers with their brood sows, outside of feeding, is to not have them gentle. They must be tame and easily handled, so you can enter their pens at farrowing time, if needed, without exciting them in the least. The work of making brood sows gentle must commence while young. You break your dairy cow to prepare her for the work she is to perform, so you must prepare the young sow for the work you wish her to perform. To do this the sow must be handled gently; avoid chasing or striking her. Most farmers would find it to their advantage if they occasionally spent some time in getting acquainted with the brood sow. No animal will become tame quicker and wlll show signs of appreciation quicker than the hog, despite the fact that so many seem to think that anything is good enough for the hog. We now have on the farm thirty brood sows and every sow knows the pen that we expect her to farrow in. They can be taught much easier to take their places than the dairy cow, at least I have found it so.

One of the great damages when brood sows get pretty well along towards farrowing time, is too many crowding together, thus causing the loss of pig and the sow loosing her pigs before farrowing time.

### Proper Food for Brood Sow.

I wish I had more time at my disposal, as I would like to talk longer on this one important subject, but I will pass on to her feed for a moment. Of what account is a balanced ration unless you use judgment and care in feeding it? Regularity must go hand in hand with feeding, and not only this, but the proper amount for the purpose we wish to accomplish.

Every year witnesses the same thing; one farmer has a nice bunch of pigs to turn off, while his neighbor with an equal number of brood sows makes a failure. Care and shelter play as important parts as breed and feed; they must go together, one cannot survive without the other.

It requires knowledge to successfully grow good pigs profitably and it all cannot be learned at school, except the school of experience, good sense, and sound judgment.

### Care of the Head of the Herd.

So far I have spoken to you of the brood sow, but we are told that the male constitutes half the herd. We will take this for granted, but I have great faith in a good mother for man or beast. But since he occupies this prominent place in your herd, a word about his care will not come amiss.

Stop, think for a moment of the number of young boars that will be bought in the next few months by the farmers and from what I have seen I feel safe in saying to you that a large per cent. will fail to realize much good from them by not properly caring for them after they get the pig home and the fault not all lies with the farmer. Too many breeders feed young breeding stock for fat and looks, forgetting that the principal part they are to play will call for constitutional vigor, and you must have growth.

The first thing you do, if you intend to buy a male, is to get him early. Feed him for the purpose for which you get him; don't spoil him for want of proper exercise or by loading him down with fat; don't turn him loose with a lot of other hogs; train him to be gentle, so he can be driven anywhere without arming yourself with a pitchfork and calling the rest of the family and the dog; overcome this by gentle treatment. Put him where there is a good fence. Many hogs are spoiled and much damage done by poor fences to start with and where the boar once acquires the habit of breaking out he will never get thoroughly over it.

### Profitable Hog Raising a Science.

Let me tell you there is money in the hog business if properly conducted and you are money out if not properly conducted. There is no reason why science cannot be used in breeding and feeding hogs as well as in the construction of the train that brought us here to Marshfield.

But you must think for yourself, use experience with intelligence, for remember every man is the architect of his own fortune. Talk about luck with hogs! Get a move on you, do some thinking and action and luck will be on your side.

I hope I have said something to you today that will interest you in raising hogs, for along these lines I have met with better success than I ever expected to a few years ago.

## DISCUSSION.

Mr. Convey—What kind of floors would you recommend in the hog pen?

Mr. Fisher—We have used dirt floors and board floors. The dirt floors become filthy and I like board floors best, because they can be kept cleaner. We use board floors in our sleeping apartments, we have a double floor with two thicknesses of tar paper between. And there comes in another thing, that is drafts. Avoid any cracks where cold drafts can plow on your pigs, or any kind of hogs.

Question—How large a room would you have for a brood sow?

Mr. Fisher—The brood sow pens are six by eight feet and the pen in front, which is not covered, is the same size.

Mr. Imrie—Did you ever try cement floors for your hogs?

Mr. Fisher—No, I don't know anything about them, but it doesn't seem to me, from the nature of the cement, that it would be as good for a floor for a farrowing pen; it is pretty cold and damp.

Question—Aren't you in favor of those cottage pens?

Mr. Fisher—I like them very well, only as I have thirty, and sometimes forty brood sows, I couldn't manage that many pens, on account of so much work at feeding time. It is very necessary in raising swine to change the location of these houses, and it is a great disadvantage to have a permanent house. It is a bad thing to have pigs in the same place year after year. We overcome that by not having any hogs for at least four or five months in the winter in the pens that we expect to use as farrowing pens. We clean them out thoroughly in the fall, and in that way we overcome to a great extent the danger of keeping hogs in one place year after year.

Question—Those cottage pens are easily removed?

Mr. Fisher—Oh, yes, you can handle a few pens that way.

Mr. Hardy—I raised two hundred and fifty pigs on cement floors last year and we didn't have any trouble.

Mr. Fisher—There is another point which is very important, which is to have a rail about eight inches from the floor and about eight inches round, so that the sow won't lay over on the little pigs. We also have a sloping floor for the farrowing pen. We lose very few pigs that way, by having a slope to the back of the pen.

Question—Do you have any trouble with sore mouths of the pigs?

Mr. Fisher—No, we keep the pen clean. I think that is brought about by filth.

Question—Do your pigs ever show high tempers early in life and bite each other?

Mr. Fisher—Yes; then we find it necessary to remove one of the pigs, or take nippers and remove the baby teeth or tusks.

Prof. Moore—You speak of a sleeping pen. Is that in the farrowing pen?

Mr. Fisher—That is where we keep the sow and pigs, in this farrowing pen, until the pigs are large enough to run out. In front of that we have a large feeding floor and a double door, which we open and let the pigs run out. There is a sloping floor where they farrow and sleep.

Prof. Moore—About how large a slope would you have in eight feet?

Mr. Fisher—I think two inches would be plenty. It doesn't require much. The nest will all work down to one side and the brood sow comes in and the pigs are away from her.

Mr. Martiny—I used these little cottages once for farrowing and I took and put a fence post raised just enough. The sow would lie along this upper side and the pigs were always safe.

Question—How do you ventilate?

Mr. Fisher—We ventilate a good deal as it is in a dairy barn, but with these low hog houses we use there is a good deal of ventilation by the door on top. If it is a warm day, those doors are always open.

Mr. Stiles—How long do you keep a sow shut up before she farrows?

Mr. Fisher—Perhaps three weeks before she farrows. She knows her place and comes there and for about two weeks before she farrows we put her in there continuously, especially at night. Somebody has spoken about sugar beets here. We feed our sows roots or potatoes every day for five or six weeks before they farrow.

Question—What kind of bedding?

Mr. Fisher—I prefer wheat straw, and not very much of that, put in a few days before she farrows, so that the sow has that compact for her nest.

Question—How often do you change that?

Mr. Fisher—Every four or five days, sometimes oftener.

Question—How old do you have your pigs before you wean them?

Mr. Fisher—I don't like to wean a little pig at all, unless I want to breed the sow; then, perhaps, at two months old. I prefer to let them wean themselves, but if I was going to wean them I would shut the brood sow up and let the little pigs run out on the pasture and come in to the sow when they want to. We feed the sow dry feed and in a few days the pigs wean themselves.

Question—Wouldn't a little chaff or cut straw be better for the farrowing pen?

Mr. Fisher—If you put it in a few days before, she gets it cut up, so that there is no danger of the little pigs getting mixed up in it.

# FEEDING SWINE.

**DAVID IMRIE, Roberts, Wis.**

Mr. Imrie.

After having the hogs bred as Mr. Martiny has told you, and housed and cared for by Mr. Fisher, it will not be hard to feed them.

### The Breeding Stock.

We will commence with the breeding stock. Separate them from the ones you intend to fatten, give them plenty of range on good pasture with some grain to keep them in good condition. Their feed should consist largely of middlings and oats. We feed the middlings in slop and the oats whole, scattering them on a feeding floor or on the ground, and a little corn as the weather grows colder, adding some roots fed raw three or four weeks before farrowing. If you have no roots, feed some bran and oil meal, something laxative, so that the sow's system will be in proper condition. During the winter give the sows the clover heads and leaves that accumulate on the barn floor; they will relish them.

Don't neglect exercise. Let them have the run of the barnyard, providing you have no horses or colts in the yard to chase them, as I have lost quite a number of pigs from this cause. Keep charcoal, ashes and salt before your hogs at all times. I like Mr. Theo. Louis' mixture, which is eight bushels of charcoal, one-half bushel of wood ashes, eight pounds of salt. Mix the compound well, then dissolve one and one-fourth pounds of copperas in a pail of hot water and sprinkle on the mixture, shoveling it over, then put it in a self-feeding box, with a cover to keep out the rain and snow, and let them help themselves.

After the little pigs arrive, do not be too good to the mother and feed her all she can eat, but give her a drink of warm water with a little bran or shorts in it. Increase her feed gradually, taking about ten days or two weeks to get her on full feed, then feed her all she will eat up clean three times a day, and provide her with a good pasture and plenty of fresh water.

We never try to coax the little pigs to eat, but feed the mother well and they will begin to eat with her, then we arrange a yard so that the little ones can get in but not the old ones. We place in this shallow troughs and feed the little fellows skim milk and middlings and soaked corn. Be careful to keep these troughs clean and only let them have what they will clean up. If there is any left, clean it out and give it to the old hogs. In warm weather we simply soak our middlings, ground succotash and oatmeal from one feed to the next. In winter I like to have the slop warm.

We seldom wean our pigs, but if you are obliged to wean, shut up the mothers and let the pigs have their liberty. Now feed these pigs well and keep them growing, so that you can get them on the market before cold weather, weighing 185 to 250 pounds. We never confine our pigs in small yards or pens to fatten, unless it is the last week or two.

Ready for the Cornfield "Bonnie View."

### Pasture.

In northern Wisconsin, where we can grow clover in abundance, there is nothing better for a hog pasture. June grass makes an excellent spring and fall pasture. If you have neither, sow some barley or rape, or oats and rape as early in the spring as you can work the ground and again in two weeks and turn the hogs on same when the barley or oats is five or six inches high. Later you can sow some rape alone, which will give you excellent results as a pasture. We sow rape in a part of our corn at the last cultivation (about three pounds per acre) and when the corn is ripe turn the hogs in to the field, giving them only enough to last them two or three weeks.

Of course you lose the fodder, but it saves a good deal of work and it is at a time when we are very busy cutting our corn and filling the silos and with the scarcity and high price of hired help I think it is as good a way to harvest a part of the crop as I ever found. We have a large acreage of corn every year and an abundance of fodder without this and I have never seen hogs do better than when they have had free access to a corn field with rape in it and a good clover patch by way of variety. We always feed some slop composed of middlings or ground succotash and skim milk and water at this time. Raw pumpkins fed during the fattening period I have also found beneficial.

### Alfalfa Hay for Pigs.

The Kansas Experiment Station has recently reported the results of experiments made during the fall of 1898 to test the value of alfalfa hay fed to pigs receiving all the grain they could eat. The pigs averaging 125 pounds each were placed in lots of ten in large pens provided with shelter sheds open to the south. Alfalfa hay of the best quality was fed dry in a large, flat trough, the pigs receiving in addition all the black-hulled white Kafir corn they could eat without waste. The animals were given more hay than they would eat and they consumed only the leaves and finer stems.

Beginning November 24 and continuing nine weeks, one lot of pigs was fed alfalfa hay and Kafir cornmeal dry; a second lot, Kafir corn dry; a third lot, Kafir cornmeal dry; and a fourth lot, Kafir cornmeal wet. The gains per hog in the nine weeks from the different methods of feeding were as follows:

| | Pounds. |
|---|---|
| Kafir cornmeal dry and alfalfa hay | 90.9 |
| Kafir corn whole ...... ......... | 59.4 |
| Kafir cornmeal fed dry ........ ... | 52.4 |
| Kafir cornmeal fed wet ......... | 63.3 |

Farm Buildings "Bonnie View," Home of David Imrie.

At the end of the experiment, the alfalfa-fed pigs were well fattened and were marketed. It is estimated that under normal conditions it would have taken four or five weeks longer to put the other lots into good marketable condition.

The gain from feeding alfalfa hay with Kafir cornmeal fed dry, over the meal alone fed dry, was more than seventy-three per cent. Ten hogs in nine weeks were fed 656 pounds of alfalfa hay and for each 7.83 pounds of alfalfa hay fed with dry Kafir cornmeal, the hogs gained 3.4 pounds over those having dry Kafir cornmeal alone, a gain of 868 pounds of pork per ton of alfalfa hay. These results are not due to the feeding value of the alfalfa alone, but also to its influence in aiding the hogs to better digest the Kafir corn. The alfalfa hay also gave a variety to the ration, making it more appetizing and inducing the hogs to eat more grain.

The ten hogs having grain alone ate 3,885 pounds of dry Kafir cornmeal, while the ten hogs having hay and grain ate 4,679 pounds of the Kafir cornmeal and 656 pounds of alfalfa hay.

Mortgage Lifters at Lunch, "Bonnie View."

The hay-fed hogs ate more grain and gained more for each bushel eaten.

This experiment not only shows us the value of alfalfa as a food for hogs, but the value of having a variety and also some bulky feed in connection with the concentrated feeds.

If we will only keep this in mind, that the hog requires a variety of foods, also some bulk to his food, it is not hard to feed hogs in Wisconsin and make good money thereby.

## DISCUSSION.

Prof. Moore—Do you have any difficulty with having sows eat their pigs?

Mr. Imrie—I never have had that difficulty in all my experience in hog raising. I think it is altogether due to the manner of feeding the sow before she farrows. If her system is in the right condition, there is no danger of her eating her pigs.

Question—You spoke of feeding roots for a while before farrowing. Is there any objection to feeding them all winter?

Mr. Imrie—No, sir, not if you have plenty of roots.

Mr. Fisher—It is very seldom that

sows will eat their pigs if properly fed on roots or some other such food. They never do it in the summer time. I have always noticed it is those sows that have been fed on a very rich diet, such as grain. We have overcome it entirely by feeding roots and potatoes.

Mr. Goodrich—I notice that all these hog men, as well as other breeders of thorough bred stock, recommend the raising of but one litter of pigs in the year from a sow. Now, is that the best way for our ordinary farmers? It seems to me it costs too much to keep a sow a year to raise but one litter of pigs. If I am wrong about this, I have been making a mistake ever since I commenced to raise hogs, because it has always been my practice to raise two litters a year, and I think I got just as good growth out of each litter as if I had raised only one. I have in mind now one sow that raised me sixty pigs in three years, two litters each year, an average of ten. Of course this sow was unusually good.

Mr. Culbertson—Tell us about the poor one now.

Mr. Goodrich—I had a poor one that only raised three pigs, and only had one litter in the year.

Question—Do you ever feed barley meal instead of shorts?

Mr. Imrie—I never have fed much barley, but it is good feed. In regard to what Mr. Goodrich has said, I think breeders feel that if they raise two litters a year they cannot sell the fall pigs to as good advantage as they can the spring pigs, but we must always raise a few litters of fall pigs, and all the spring pigs that we can, as our main crop. We only raise enough fall pigs to use up what milk we have, and other feeds to advantage in the winter, but if we raised as many as we do in the spring it would be harder to care for them in the winter in this climate.

Mr. Culbertson—I think it is mostly dairymen who have a large quantity of skim milk who handle fall pigs to advantage.

Mr. Fisher—That is what I meant when I spoke of raising only one litter.

Mr. Roberts—One word of warning in regard to feeding barley to brood sows. It is very constipating, and I would not want to feed it for some time before farrowing.

Question—Does alfalfa make a better pasture for pigs to run on than clover?

Mr. Imrie—No, I think not. I spoke of this to illustrate the value of giving some bulky food to pigs. You cannot pasture it very close.

Question—Do you cook your feed?

Mr. Imrie—No, nothing but the roots, that is, potatoes. If I had a large quantity of potatoes in the fall and wanted to feed them, I would cook them.

Question—If you were feeding rye or barley, wouldn't you cook it?

Mr. Imrie—No, we never have. I would grind rye in all cases before I fed it to pigs and simply soak it. I like it warm in the winter, but there is no advantage in cooking it unless the pigs like it better that way. Sometimes in warming it, it gets up to the boiling point, and that practically cooks it.

Mr. Fisher—To feed potatoes to fattening hogs, it is very necessary to cook them, but to feed them to brood sows, it is not, because if you boil the potato you are spoiling the very effect that you are after in feeding it, or any other root.

Mr. Convey—What is succotash?

Mr. Imrie—It is wheat and oats ground together. We sow it half and half, and we grind it just in that shape.

Question—What ration do you consider best to feed the sow after farrowing when she would be on full feed, up to the time of weaning pigs?

Mr. Imrie—Middlings and succotash. Middlings is the main part of the slop, and of course good corn and the more skim milk the better.

Question—What is the matter with oats and peas?

Mr. Imrie—That is all right in localities where you can grow peas.

Question—How about rye for the swill for the sows?

Mr. Imrie—I have never fed much rye.

Question—Can't you get just as good results from skim milk and middlings without the corn?

Mr. Imrie—No, sir, not when they are on pasture.

Question—Do you consider rape very good fall pasture?

Mr. Imrie—Yes, we sow rape—if we have no clover. If we should be in such a condition, and I think we will be this spring we will sow some rape and barley early in the spring and turn them on it when the barley is about six inches high. Then we sow rape in our corn at the last cultivation and turn them into that later.

Mr. Convey—It is all nonsense to discrimnate against corn the way some people do. They feed their sows upon highly nitrogenous food and they get their digestions out of condition. There is no reason why we should not feed a certain amount of corn, for summer feeding, but I would soak it in every case.

Question—For small pigs, would it be advisable to feed ground feed raw or scalded?

Mr. Imrie—I don't think it makes any difference if it is soaked in the summer time. In winter we use warm water for soaking.

Question—In the winter time, if you take barley and oats ground together and take boiling hot water and scald that feed and allow it to soak three or four hours, wouldn't it be more digestible for young pigs in cold weather.

Mr. Imrie—Perhaps; if they will eat it better I would cook it.

Mr. Arnold—If you had just enough milk to feed your pigs and have them thrive, would you think it a good plan to buy some more hogs and mix with that some cornmeal?

Mr. Imrie—I never have fed pigs on milk alone and I don't think I will ever try it. Be sure to have corn with your milk, and I believe that the experiments at the different stations show that you will be wise to put in about one pound of cornmeal to three pounds of milk to get the best results.

# THE GOAT.

E. NORDMAN, Polar, Wis.

Mr. Nordman.

The angora goat is useful for the production of meat and mohair and for the help it is in clearing land of brush and weeds. It is said that there are very few pure-bred angoras in the United States, much the greater part of those now here being the result of a cross of the pure-bred angora on the common brown goat. For all practical purposes, however, the high grades, fifteen-sixteenths or above, are as valuable as the pure-breds.

In regard to the increase, I believe this is about the same with the angora goat as with sheep. The nannies have one or two kids each once a year and after the first two or three days they seem to be as fond of their young as are the ewes.

At kidding time it is necessary to shut the goats in some enclosure, so the nannies that do not take readily to their young can be confined in a small pen by themselves with their kids. From one to three days of this confinement makes of the old nannies the best of mothers.

When angora goats have access to brush, especially the twigs and branches of trees that have been cut down for wood or logs in clearing land, there is no other animal on the farm that can be carried through the winter on so little feed. They will eat the bark and browse of soft wood trees with a relish, and do well on it, with a very little timothy hay night and morning in addition. My sheep would certainly starve on the feed that is keeping the goats in prime breeding condition.

Our goats were bred so as to drop their young during the last part of April and the first of May. We have a small brush lot near the house in which they will be kept during this time, so they will make us very little extra work and expense. If they were to kid earlier, I suppose it would be necessary to feed the nannies a milk-producing food, so they would be ready to supply their young with nourishment, but where they drop their young the first of May, or thereabouts, they get the proper nourishment from buds and leaves that come out at this time of the year and a little earlier and they do not need anything else.

The angora goat is also much hardier than is the sheep. We have had none die yet and have not even had them out of condition sufficiently to make it noticeable. There are no scrubby ones in our flock, although they were not sorted out last fall, and all of them seem to be in the best of health.

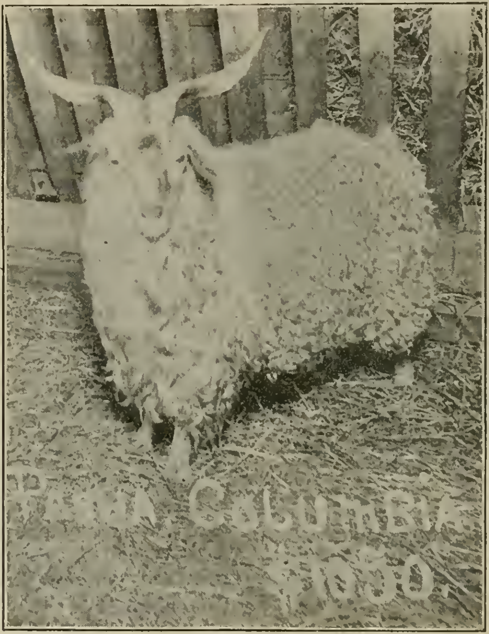
### Value of Mohair.

The value of the mohair and the amount of it that one animal will shear, depends largely upon the grade of the beast, and, other things being equal, the higher the grade the better the quality, and the greater the quantity of mohair that one animal will shear. A fifteen-sixteenth cross will shear from two and one-half to four pounds, according to the way it has been reared and kept. This mohair should bring from thirty to forty cents per pound, according to its quality. The lower grades, however, produce mohair that is worth no more than wool and they shear a great deal less than the high grades.

To get all the mohair, it is necessary to shear not later than the 25th of March in the climate of northern Wisconsin. They begin to shed their coats about this time and soon lose the most of it running in the brush if it is not taken from them. Shorn at this time, they will not suffer from the cold if they have a dry place at night that is sheltered from the wind.

### Goat Used for Food.

The flesh of the angora goat is much the same as mutton or venison, depending upon the way it has been fed. It is regularly sold in the markets of Chicago and other places and goes to the consumer as mutton, with no material injury to any one as the result of the deception. When it gets the principal part of its feed off of wild brush lands, it is said that the meat takes on the flavor of venison. We used it on our table last fall and the help liked it as well as either beef or mutton.



"Pasha Columbia" champion of 1901; sold for $1,050.00. Picture from "American Sheep Breeder."

### Angora Goat Without Odor.

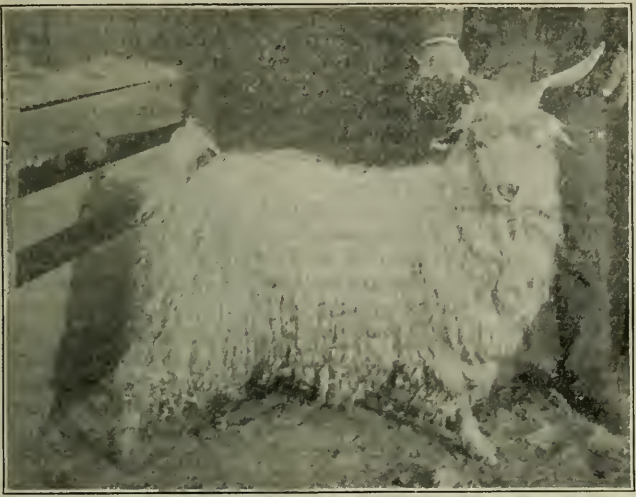
I am often asked regarding the odor of these animals, it being thought by many that they have the same loud smell as the common goat. Such is not the case, however. They are as free from offensive odors as any other animal on the farm.

### Goats not a Protection Against Dogs.

We see it advertised frequently that a few angora goats in a flock of sheep are a protection against dogs. From the way that my flock runs for the yard on the approach of a strange dog, I am led to believe that the angora goat cannot be credited with this virtue. My goats are about as ready to take alarm and get out of the way of danger as the sheep are, the only difference being that the goats can run faster.

### Fences.

In regard to fencing, it is sufficient to say that any fence that will turn sheep or hogs is good enough for angora goats also. My fences, all except two hundred rods, are built of cedar posts placed eight and ten feet apart, with two boards six inches wide nailed to the bottom and four barb wires above the boards. The two hundred rods are built of woven wire. These fences are never molested by any of the domestic animals and no more so by the goats than any of the others.



**"Aztec," the champion angora goat of 1903, sold for $1,400. Picture from "American Sheep Breeder."**

### Goats Valuable Help in Clearing Brush Land.

When the angora goat can be bought at a reasonable price, say $3.00 each or thereabout, it will pay every man who has a considerable quantity of brush land to clear up to get a flock. They do better on this kind of land than sheep do and besides destroy more brush. But it must be remembered that they are not so large as sheep and sold in the open market for their meat alone will not bring as much per head as sheep will. Their fleeces also are not so valuable on the average as those of sheep. On this account I would not think it advisable to pay the big prices that have so far obtained in northern Wisconsin for the angora goat, but at a reasonable price I repeat that it pays to have them if there is work for them to do and the fences are built in such a way as to keep them in their place.

As I see it, the angora goat question may be summed up about as follows. It pays to get goats in the place of sheep if one is prepared to purchase a fair-sized flock and has the brush land for them to work on. The purchase price of the grade angora should not, however, greatly exceed the price of sheep and they should be bought in sufficient numbers to make it pay for the extra fencing that would have to be done on their account, but on cleared up farms, or where there are not to exceed five or ten acres of brush land on the place, in my opinion it will pay better to stick to the sheep and use the axe or brush scythe on the large, tough bushes that the sheep will not destroy.

## DISCUSSION.

Question—Will goats climb trees and bend them down to eat off the leaves?

Mr. Nordman—Yes, if the trees are small enough. A bush five or six feet is usually destroyed by the angoras.

Question—How thick?

Mr. Nordman—Well, say half an inch, maybe a trifle more.

Question—Do you confine them to small pastures, or large pastures?

Mr. Nordman—Mine run out in a thirty-acre field. I have three hundred acres of wood pasture fenced up, they run on that, and I notice they clean the brush up as far as they go.

Question—How many have you?

Mr. Nordman—Thirty-five.

Mr. Daniels—Is it necessary to house them in the winter time?

Mr. Nordman—Not more so than sheep. We have a place for them that is dry and sheltered from the wind.

Question—You say you balance your rations with timothy hay. Are trees and bark protein or carbinaceous?

Mr. Nordman—I can't say. I know they do well on bark and twigs and timothy hay.

Mr. Croman—I heard of angoras selling as high as $1,500.00 last year. Would you advise us to buy that kind of fancy stock?

Mr. Nordman—Not unless a person wanted to breed fancy stock.

A Member—In Chicago we are using goats to clean up the streets. They will eat anything from old rocks to political newspapers.

Capt. Arnold—Will the angoras leave good grass for bushes?

Mr. Nordman—Not good grass, but they will leave short grass and go into the brush. If we have blue grass four or five inches high, they will eat that in preference to going into the brush.

Capt. Arnold—My neighbor says they will eat the brush always in preference to grass, and I conclude that is pretty good testimony that he doesn't have good grass.

Mr. Nordman—I have goats and sheep running in the same pasture, the sheep usually keep the grass down pretty well, so the goats prefer the leaves rather than pick after the sheep.

Mr. Stiles—Will they go out in your orchard or where the raspberries are and destroy them?

Mr. Nordman—It cost me $10.00 for my goats having been in a neighbor's orchard last spring.

Capt. Arnold—Will they cut down a tree when they are hungry?

Mr. Nordman—They will kill small soft wood trees by eating the bark from them as high up as they can reach. Poplars, basswood, balsam and older bushes are among the kinds of timber which they destroy in this way.

Question—Will they go for any kind of brush on your brush land?

Mr. Nordman—Yes, they eat the

leaves of any kind of brush that grows on my farm, but only the bark from the soft wood trees.

Mr. Reynolds—They kill a good deal of the brush by walking over the roots, don't they?

Mr. Nordman—I don't think they do, any more than any other animal.

Mr. Utter—You wouldn't recommend a horticulturist to go into angoras?

Mr. Nordman—No, sir. Fruit trees won't do well where angoras are kept.

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# GOOD ROADS.

**CHAS. T. HARRISON, Special Agent and Road Expert, Office of Public Road Inquiries, Department of Agriculture, Washington, D. C.**

Mr. Harrison.

It is certainly an earnest of the great interest taken in the subject of good roads in this state when the Office of Public Road Inquiries in the United States Department of Agriculture should be asked to send a missionary to "swing around the circle" of Farmers' Institutes and to appear at this great Round-up.

For the past month good roads talks have been given in various portions of your state, and close attention paid and enthusiasm manifested wherever such talks were given. It is this meeting together and discussing great questions that bring results.

There is no question of greater importance before the American people today than this question of improved roads. We have the greatest country and the poorest roads of any on the globe. Why this latter condition should prevail is a wonder to all other countries. Possibly, in the mad rush for wealth, such a little (?) thing as the common road has been overlooked, and yet, it is over this common road that 90 per cent. of all the products of the country have to pass before the market is reached. Did you ever stop to think of that? Again, the railroads have so penetrated every portion of the country, that they seemed to fill every niche; but with the expansion of the country and the greater demands for our goods and products, public roads are in demand and, in this age of the best, the new roads should be of the best; hence this agitation. It is this matter of transportation that must be considered, if we would reap the benefits to be derived from this increased demand for our products. It is a well-known fact that wagon transportation over bad roads is a big and costly item. There may be some here who do not know what a vast sum of money is thrown away annually by reason of bad roads. A few facts concerning that waste may not be amiss. A few years ago, the Office of Public Road Inquiries investigated the matter; it was found that the average length of haul by wagon was twelve miles and that it cost twenty-five cents per ton per mile to haul it, or $3.00 for the haul. The total tonnage was 300,000,000, the consequent cost being $900,000,000. Comparisons were had with the haul in foreign countries, where good roads prevailed, showing the average cost in those countries, over good roads, to be a fraction over eight cents per ton per mile. This seemed to conclusively prove that the bad roads of this country entailed a loss of over $600,000,000 annually. But the average citizen will ask "How does this effect me, individually?" If there has ever been a time when there was a great demand for corn, hogs or any other marketable product, with a consequently high price, that you were prevented from hauling right at that time, you have had your share in the loss above mentioned. If good roads will reduce the cost of hauling two-thirds, why not try to have them? "But," you will say, "we cannot afford them, they cost money, and we cannot so tax ourselves." How about that other tax, the greatest that we have to pay—the Mud Tax? You pay that every year and, until better roads come, that tax will continue to be levied and you will have to pay it. The people of this state and country have a means of relief in state and national aid. The latter worked successfully in the younger days of the republic and, under wise administration, would work again. The former, state aid, has worked well wherever tried.

### Objections Raised Against Governmental Aid.

There are people who decry against the general government building or helping to build roads. The cry of paternalism is raised; but you all probably know that in those countries where the roads are built by the government, the best roads exist. Take our own country for example; in the early days of the past century, our government did build roads and paid all the cost, and the comparatively small amount of work done showed it to be well done, and of a character that has withstood the travel of all the years that have passed. Now, what was the result after the government abandoned road building? Why, the work was turned over to the states, and by the states to the counties, gradually getting into the hands of purely local officials. The result is the lack of any system at all, except that antiquated relic, the working-out system. You know well how little good results therefrom. And who is to blame? The people themselves.

For an example, take Wisconsin. Time and time again has your great state had good measures, designed to better existing conditions, before its legislature, but the people failed to instruct its representatives to grant this relief and the measures have failed. It is but just, however, to except those bodies, notably Farmers' Institutes, that have endorsed such measures and petitioned the legislature to pass progressive laws.

The same objection made by the states against national aid is made by the counties against state aid, of any kind. Under such aid the burden of cost is so distributed that all the people pay all the cost of the roads. This is but fair, as the roads are not personal property, but everybody has the perfect right to use them, and everybody should be given an opportunity to help pay for them. In the states having state aid, the utmost satisfaction prevails, and if an effort should be made to return to the primitive systems, or lack of systems, of road building, a greater fight would result than the fight made when such laws were first presented for enactment. There are many forms of state aid, such as giving money for building roads, empowering counties and local districts to issue bonds, use of convict labor, encouraging or demanding the use of wide tires, authorizing the purchase of improved machinery, substituting the cash system for the too prevailing one of working out the road tax, etc., any one of which would be a step forward.

On my first visit to your senate chamber, two years ago, I was much struck by the motto above the presiding officer's chair—"Progression"—and as I listened to the talk against the good roads bill, then before the senate and heard the result of the vote turning the bill down, that motto seemd to change its form to "Retrogression." The people of this state need to bestir themselves in this matter, and see to it that the state's motto means what it implies, and the state jumps into line with those other states that are progressive in this great question, that is of the most vital importance to all the people.

### Aim of the National Good Roads Association.

The National Good Roads Association, which is doing great good in educating the people of this country along the lines of road improvement, has for its motto, "Organization, Agitation, Education, Legislation." In that motto is summed up the pith of the matter. In order to get results you must organize bodies to work for road improvement, keep up an agitation that will educate the people and then, and not till then, you will be able to get legislation that will enable you to go forward.

### What the Office of Public Road Inquiries is Doing.

It is in the line of education that the Office of Public Road Inquiries is especially exerting itself, not only in sending out missionaries to appear before such bodies as this, and in the disseminating of valuable information in the shape of bulletins—and circulars, but in the construction of object lesson roads, where invited to do so, according to its means. In this work great good has been done the past few years in many of the states. Being an office in the Department of Agriculture, its first work was done at, or in connection with, State Experiment Stations; but in more recent years aid has been given wherever communities were willing to co-operate to the extent of furnishing materials and labor; the office furnishing the necessary machinery, experts to run the same, and skilled supervision. In furnishing machinery for such work, we have been aided by the manufacturers and railroads. Under existing conditions, our work will continue on those lines, or until sufficient funds are appropriated whereby object lesson roads can be constructed free of expense to the communities.

### The Work in Wisconsin.

A few years ago, a man known to many of you, either personally or by reputation, who has done more in the cause of education in this state than any other single person, in the form of establishing county normal and agricultural schools, traveling libraries, in common school work and as a regent of the university,—I refer to Hon. J. H. Stout, of Menomonie,—in order that the peple could know more about modern, improved roads, had one constructed near his home, at his own expense. This work was done under the direction of my father the late E. G. Harrison, the first special agent and road expert of Road Inquiry, who has frequently appeared before your Institutes, and who was known by many here today. In that work improved machinery and methods were used, and a road built that is good today, though but little attention has been given to it since its construction. A valuable bulletin, well illustrated, describing the work in all its branches and containing valuable information on road building, has been issued by the State Experiment Station, and is here to be distributed. I would recommend its reading by all interested in the work of road improvement.

In building this road Senator Stout builded a monument to himself greater than that erected to the memory of "The Father of His Country," in that Senator Stout's monument is one-half mile long, and can be ridden or walked over by all, whereas the latter is less than one-fourth as large and stands straight up in the air. In recognition of his great interest in the good roads cause, Senator Stout was later made a special agent of the Office of Public Road Inquiries for the Middle-Western Division, embracing nineteen states, and it was my proud privilege to have been made his assistant during his occupancy of the position.

Another object lesson road is expected to be built, the present year, in your state at Tomah, in response to urgent requests from citizens, backed by Congressman Esch. Here, as in other places where such work has been done, improved machinery and methods will be used, and an opportunity given for all road supervisors and interested citizens to be present to study those methods and gain information.

Pending the enactment of laws that will aid you to further the work on broader lines, you have a great deal to do and the question is "How shall it be done?" While it is true that only the best results come from a definite system, much good can be done if we know how to apply common sense principles. One thing our Office endeavors to do is to show how local materials and conditions can be best utilized, and for a time we will discuss the question from a practical standpoint.

### Some Things Essential for Successful Road Building.

A road, as generally defined, is a place or way upon which one may travel (when one can). In my adopted state, New Jersey, the legal definition is "one that is firm, smooth and convenient for travel at all seasons of the year;" a most desirable definition, as you will probably admit.

While the building of roads is looked upon as something too great to undertake, it is but a simple thing, after all; there are but three things necessary to the work, according to one of the foremost road-builders of the day, and they can be summed up into one word, viz: 1. Drainage; 2. Drainage; 3. Drainage. To this, however, it would be well to add the word "grading," for one cannot be had without giving the other. Drainage may be had in two ways, viz: 1st. by surface draining, by proper shaping and ditching; 2d. underground draining by tiling. The cause of bad roads is—water, and water is the greatest coward known; it will always run if you give it a chance. But, too often, we dam it in the roads. Ex-State Senator Earle, of Michigan, once got off this toast at a banquet of the L. A. W. in Connecticut:

"Here's to King Mud. Dam him? No.
For if you dam him, he will grow;
Ditch him, drain him, roll him, stone him,
Then the Arch Fiend will have to go."

When water leaves the clouds it seeks to reach the center of the earth, but meets with obstructions; according to the density of these obsructions is its capability of getting away. If porous sand or gravel it goes quickly, if of clay it has to be assisted. Earth is composed of voids, if it were not so, air and water could not get in to nourish plant life; this is as it should be, but in road construction these voids must be filled up or pressed together to keep water out. It has been found that a cubic foot of earth contains 25 per cent. of voids near the surface, through which water readily passes, but farther down there are but 12 per cent. or 15 per cent., owing to travel having compacted the earth, making it harder for water to get away. By creating a vacuum water will flow; by tiling you will have made that vacuum.

Of course, having made it, an outlet will have to be provided for the water to get away from the road.

Grade to provide surface drainage, as well as to lower hills and raise hollows. In many sections of the country, the cutting down of hills would be a great advance in road improvement alone; by taking three feet from a hill and putting it in a hollow, the grade has been lessened six feet. The less the grade the lighter the load; the smoother the surface the less the grade should be. The National Pike, running from Cumberland, Md., through that state, West Virginia, Ohio and into Indiana, built by the government in the early days of the country, called for grades of not over eight feet to the hundred, but modern methods give from five to six feet as the greatest, less being more desirable. "Go to the ant, thou sluggard," is good advice, except when applied to road building. If that is followed you will do like the ant and never go around an obstruction. Ants evidently built the roads in many sections of the country.

### Intelligent Supervision Necessary for Construction of Good Roads.

Every road is capable of improvement, and the best is none too good. If we cannot always have the best, what should be done? Use what nature has provided. There are sections in your state where it has been said that there is no available material for roads, and yet, I have seen, in those very sections, plenty of good material that, if rightly applied, would vastly better the roads of that section. In building new roads or improving old ones, you should remember to get above the water, and get water away from the roads to the nearest natural outlet or running stream. Highways are but primitive railroads. The latter are built almost anywhere, by getting above the water, but they are built by men who know, under intelligent supervision. It is this latter point,—intelligent supervision—that counts most in improvement of any kind.

It is too often thought that anybody can build a road, but a greater mistake was never made. When you want your watch repaired, you do not take it to a blacksmith; when you want your horse shod, you do not go to a shoemaker; when you want a house or barn, or silo built, you get men who understand the business, but when it is the common road that is to be built or repaired, any sort of a man or boy will do for the work. That is all wrong, but it will prevail as long as the present lack of system exists in so many of the states. When a good supervisor is elected, one who tries to do good work and does it to the best of his ability, keep him in office. The plan of changing supervisors at every election or two, to give somebody else a job, is a bad one and works to the continued lack of improvement.

### Modern Machinery also Indispensable to Good Work.

In addition to intelligent supervision, modern machinery should be used, it is indispensable to good work. The most important for the work is, common sense, road grader, harrow and roller. Without the first nothing can be done; the second is familiar to all of you, the third is used to pulverize clods and to more evenly distribute or mix materials, and the last —the roller—is the mason of construction, in that it drives out the voids in the earth, and by its compression causes materials to more firmly cement together. The whole secret of keeping a road good after it has been made is by the use of the roller. And in order to have any kind of a road, a firm foundation must be first had, whether the road be built of earth or foreign materials, and it is by repeated rolling that such a foundation is to be had. It is as necessary to have a firm foundation to the road as it is to a house, barn or any other building.

### Different Kinds of Roads and How to Improve Them.

There are many kinds of roads that may be built, such as common dirt road; clay and sand, well mixed and rolled; gravel; burnt gumbo; macadam; tarred or bituminous macadam; brick; steel tracks.

If it is a common earth road that is to be improved, you must look after the grading and drainage, then with the grader shape the road so that it will have a good crown, being careful not to scrape any grass, sods, sticks, stones or other foreign material on the road, for as sure as you do, you will not have a good road. Sod and grass will decay, causing holes to appear, which will hold water; and for the same reason as to holes, sticks and stones should not be permitted to remain in the scraped-up material. After the earth has been scraped to the center of the road, a harrow may, in some cases, be advantageously run over the road, to pulverize the clods and take out objectionable material, then the roller should be put on; this will drive the voids together, tending to make a tight road. Without a roller on earth roads, you simply have a loose field where plant life would flourish, but with rolling, a hard surface is formed, whereby water will not stay on it and grass will be less likely to grow. By the use of a road grader without the roller, the roads are virtually sub-soiled and, while sub-soiling is all right for the farm, it is all wrong for a road. Loose earth piled in the road will hold water, the earth becomes spongy after rains, and the ruts of wagons form troughs in which the water will stay, creating a condition in summer that should not be. The roller will, to a much greater degree, tend to keep water from going in the earth, its smoother surface causing much of it to flow off to the side ditches. It should be borne in mind, however, that an earth road will be nothing more than an earth road, but having been made firm it becomes a good foundation for re-surfacing with a more lasting material, such as gravel, stones, etc.

In the absence of the better materials for road building, sand can often be found, and it is surprising how good roads can be made with nothing else than sand to mix with the earth. This should be mixed intelligently, the best method being to prepare the road as though a dirt road was to be built, observing the methods stated, and spreading four or five inches of sand on the earth to the width desired, then with the harrow thoroughly mix the sand with the earth and roll; then another layer of sand, likewise well mixed with harrow and rolled, should form a fairly durable road for light traffic.

In a similar manner can sand roads be treated with clay. In some sections, where rollers cannot be had, the sand or clay, according to the foundation material, is put on as described, and left for travel to mix. Of course, that takes several months frequently, and the work has to be gone over oftener, but good results follow in the end.

It is by the use of machinery that quick results are obtained and, in this age, quickness counts. It is to get quick results on the farm that improved machinery is bought and newer methods employed, but on the road, little machinery and, too often, no methods are the rules. Agriculture and good roads go hand in hand, at least they should, but improved methods and machinery on the farm and none on the roads are agricultural misfits.

Should gravel be used as a covering for the roads, the earth foundation must be prepared the same as for an earth road, and the gravel placed in layers, evenly distributed and rolled. Another important machine has been omitted, and that is the sprinkler, which can be used to advantage in any kind of road building. Gravel should not be used if it is water-worn and smooth; bank gravel is to be preferred. There should be enough loam in it to form a bond. In macadamizing roads, broken stone is used, that coming from a crusher being preferred to hand-broken stone, though many good roads of the latter kind have been built. In earlier days the stone was always prepared by hand, but that is too slow for modern times. The earth foundation is carefully prepared and a shoulder excavated or made, the width of the improved portion, to hold the broken stone in place; the general practice is to place in three layers, beginning with a course of stone of two and one-half or three inches in diameter, following with one and one-half inch stone, covering the whole with screenings or the fine crushed stone. In other cases one and one-half inch stone is used for foundation and surface course; that was Macadam's idea, he saying that a stone that was too large to go in the mouth of a man was too large for the road. The size of the stone is largely determined by circumstances and the skilled road builder will be able to determine that point.

After the road bed has been formed and thoroughly rolled to insure a hard foundation, the first course of stone is placed and rolled; upon that spread screenings or coarse sand and roll hard: except on certain kinds of soil, water is not needed on the foundation course. Upon this place the second course of stone and roll; then wet and roll and follow with the screenings. The water washes the finer particles into the crevices in the stone, filling them up and the roller settles them there. Stone placed so loosely, leaving travel to settle them, requires a long time to make a road, the stones, in the meantime, being scattered to the sides and kicked and washed into the gutters. Large stones in the foundation course, except that course be the Telford method of large stones set upon edge and rammed into the bed, are a detriment to good work, as they will sooner or later find their way to the surface, leaving depressions in the surface and permitting water to stand therein.

While water is an enemy to good road construction, it is likewise a necessity to such construction, but it must be applied knowingly. That the large stones will come to the surface may be illustrated by a basket of potatoes or apples. You may put the large ones in the bottom, but if on your way to market you drive over a rough road, you will probably find on arrival that they have changed places and the little ones are at the bottom. Did you ever notice that? Judging from your smiles, it would seem that you have. Well, it works just that way on the road. If you can work on the plans mentioned and use the tools that are necessary, and employ modern methods, you wil be more likely to keep the stones where they belong. It is on stone work that the roller proves that it is the mason of construction, as here its work of aiding in the cementation of the material is best shown. When the screenings have been thoroughly rolled in, enough are added to the top to make a smooth finish, one that will effectually shed water falling upon it.

Modern road construction is but putting a roof on the road, after all, and according to the material forming that roof depends its power to shed water. Have the roof water-tight and you will not be bothered by the frost coming out of the ground in the spring. Take a wagon shed by way of illustration; many, perhaps all of you, have noticed that while the ground just on the outside is often so soft and muddy that boards have to be thrown down before you can reach the shed, that inside the ground is perfectly dry, and all because the roof has kept the moisture of snow and rain off the ground. Without moisture there is no water: without water there is no mud; without mud, the clay roads would not be the terrors they so often are so many times during the year. Have a dry foundation and a tight roof, and you have a road that you can drive on at any season of the year.

### How to Preserve Good Roads.

After the roads are constructed, care should be taken in their preservation, and every depression and rut formed should be immediately repaired with suitable material. Stone should be repaired with stone; gravel with gravel; earth with earth. The common practice in earth roads is, that if a hole appears to fill it up with sticks, stones, brickbats, or whatever is handy. This is all wrong, as such things, while they fill the hole, make a hole on each side. There is a right way of doing things, and that way should always be utilized. Narrow tires are road destroyers, and should not be permitted to be used on improved roads. Wide tires are road makers—not road breakers, and their use should be encouraged. In some of your counties narrow tires are the exception, not the rule, and, while the roads in that county are susceptible of improvement, they are in much better condition than if narrow tires were the only ones used.

Railroads understand the matter of constant vigilance, and if our roads had a part of that vigilance they would be the better for it.

In speaking of the drainage of roads, it should have been said that sand roads can be drained too much; this is noticeable along the lakes and oceans, or wherever tides flow over sand. As long as the sand is wet, wagons may be easily driven over it, but where the sun has had a chance at the sand, driving becomes a hardship. Sand can be improved by the placing of any fibrous material upon it; there are saw dust roads in this state that stand fairly heavy travel, and are readily kept in repair. In Florida, pine needles have been used to advantage. Cinders, burnt clay or gumbo, have been made to serve the purpose of bettering the roads, but there is nothing better for permanent roads than stone, although that cannot always be had within a reasonable cost. Use what an All-wise Providence has placed within your reach, and if that be not of the best, your roads will be improved, so that after a time you will be able to get something of a better nature. Improved roads mean a better return for your investment in the way of better prices, etc.

### Some Ways in Which Interest in Good Roads May be Awakened.

In order to get better roads, change the present general lack of system and substitute the cash system for the labor tax. Follow methods practiced on the railroads as closely as possible, remembering that as "constant vigilance is the price of safety," so is constant vigilance needed to keep our feet straight upon our highways. It has been truly said that "the roads of Europe receive constant attention and those of the United States, constant inattention." Have supervisors meet and formulate plans for work, with an eye to an end. Offer prizes to the supervisor for the best improvement made, as do the railroads for their section bosses.

The committee appointed by your governor has recently submitted a very comprehensive report and recommended legislation that would go far towards putting Wisconsin in line with other more progressive states.

That there is a widespread interest in this important question, is shown by the fact of the many conventions that have been held throughout the country in the recent past, and that great one that will be held in St. Louis the latter part of April, where men of National repute will gather to discuss ways and means for furthering this greatest of interests to all the people.

Keep agitating the matter in your Institutes and other meetings, and you will be bound to win out in the end. It may be long in coming, but when it does come and you have progressive laws, and are enjoying the blessings that come with better roads, you will wonder why you did not have them years sooner.

Become a missionary in this great cause, talk good roads, shout good roads, even though you may be classed among the good roads cranks; go among the people and say:

We will teach you how to mend your ways,
Likewise help you to save your souls;
For there's nothing much worse to a godly life
Than driving through mud and mud holes.

So, join our ranks, and lend us your aid,
We will all push steady and long;
And ere many years you all will hear
People shouting the good roads song.

As a sort of benediction, might be added:

Here's a long life to good roads cranks,
May their shadows never grow less;
And, in after years, when their work is done,
There'll be many their names to bless.

In this talk I have tried to set the matter before you in such a way that it could be understood, but in the discussion that is to follow, more information may be brought out that will enable us to reach better conclusions. I thank you, most heartily, for the attention and courtesy paid me here at the "Round-up," as well as elsewhere throughout the state during the past month.

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## DISCUSSION.

Mr. Jacobs—Isn't it true that the main requisite at the present time is legislation on this subject, so that the road tax may be more wisely expended?

Mr. Harrison—Certainly, that is what I have said. The work should be done under an intelligent supervision and worked out at cash rates.

Question—It is pretty hard to put a good man in as supervisor; he is doing a good deal of work for nothing.

Capt. Arnold—In your department, have you ever figured out the expense of road building in the United States?

Mr. Harrison—You mean what has been misspent, do you?

Capt. Arnold—Yes, I do mean exactly that.

Mr. Harrison—I don't think anybody has the nerve to figure that out.

Capt. Arnold—They are agitating in congress, continually, the propriety of having government appropriation. After that we will probably have state appropriation; after that county and local appropriations. The probability is that we could build good stone roads, or something else, and it wouldn't cost any more taxation than it will come to at present.

Mr. Harrison—Well, we contend that the greatest tax that the people have to pay is the Mud Tax. Perhaps I can illustrate what I mean by speaking of an individual case of a letter received a short time ago by me. The writer was a heavy tax payer in New Jersey. He wrote me that before they built their improved roads they could not average over three thousand pound loads per double team, whereas now, with four-inch tires to their heavy double wagons, they can carry from six to seven thousand pounds and the teams keep in better condition than they did before, and while their road taxes have increased about one-fourth, they get more than double the amount of work from each team and save more than enough annually, on their teams alone, to pay all their taxes.

Mr. Atkinson—If Mr. Harrison will pardon me, I think this whole discussion, so far as the roads in central and northern Wisconsin are concerned, is over the heads of our people. What we want is something that will make roads under our conditions, not under the conditions of an old, settled farming country.

Mr. Harrison—I will simply say that

you have only to use common sense and the machinery that can be had. There are plenty of gentlemen right in this session who are willing to pay their road taxes in money and not in work.

Mr. Atkinson—You see around here, practically all the farmers come in on new lands. It is absolutely impossible for the town to levy a tax high enough to build any such class of roads as you recommend. We must have roads that will admit of getting into a man's place to pull out stumps. Now what we need is some means of getting to our lands. Take, for instance, last year I had a barn to build and I was half a mile away from my land. I considered it a good investment for me to take all the town allowed me, my road taxes, and build that entire half mile of road out of my own pocket and save money. The town couldn't afford to do that. We want something that will open up roads. I know a dozen farmers around here who will be glad of some information to show us how to build an ordinary dirt road with little expense.

The Chairman—The trouble is in this locality you haven't got road material.

Mr. Atkinson—In this town I have reference to, there are probably eight or ten miles of road to be built. You are a poor tax payer in that town, and you may want a road, or you may have had one. What we want to do is to educate those people up to appropriate enough money to build those roads, and that is where the work is. We are all ready to pay for good roads who understand it, but you take the average farmer in the average town and he is not willing to go down into his pocket for money.

Mr. Utter—A new road is made in a new country by grading. If you can use a grading machine, the problem is met right there. The most that can be done here, or on any road, is the continued use of the road machine.

Mr. Culbertson—With the kind of soil we have here,—land that holds water almost like a dish,—give us the best that can be done.

Mr. Harrison—The use of the road machine, heaping the dirt up loose, don't amount to anything. It is like an open dish. Use your farm rollers, if you cannot get anything else, to keep the water out, but roll it. I am sure you can find some sand somewhere, I know you can, to put on your roads. Drain the land by some means.

Mr. Culbertson—Are we going to do this work all at one time, or are we going to work at it all the year?

Mr. Harrison—The time to do the work is when it is needed. The trouble with most people is that they do the work once a year. Again they do it often when it is too wet to work on the farm; then they go out and work on the road, and that is where they show a lack of common sense.

Mr. Rietbrock—This country is just passing from its primeval state, we are now commencing to make roads. My idea would be to lay out the road right. People who are settled in the country want to go to some particular place oftener than any other place, generally to their business town, and the roads should be laid out right. Section lines do not always indicate it, diagonal roads are often better. The roads should be made in such a way that we can carry heavy loads, and then they are worth twice as much as any other road. Now, while land is comparatively cheap, let us lay out some roads leading to the main commercial centers, and lay them in such a manner as to avoid hills. Don't feel obliged to make them straight, let them be laid in curves and we can handle very much bigger loads. The first work to be done is to take off the timber, not necessarily all the stumps, but the timber down onto it. Then figure out where must come off so that the sun can get you can place a system of ditches by which you will carry off the water, throwing the earth that you take out of the ditch in the center of the road. That is the beginning of it. Get your stumps off as quick as possible, but don't try to root them out until the stumps are somewhat rotted; my own idea would be to leave them in anywhere from five to eight years and then take them out. It has been stated here that in this section of the country the mud was so tight it could hold water, but that is not the case. The soil throughout this section of the country does not bake, it does not hold water, the soil is of a sandy nature. It is clay loam, but there is enough grit in it to admit of the water going through and out of it. My idea is that you cannot find within ten miles from this city a piece of ground that will bake and crack, because there is grit and sand enough in the soil to admit of the water passing out of it. The roads today are certainly muddy, and yet I will assert it as a fact that you can go all over the state of Wisconsin, or adjoining states, and find no bottom in the roads. It is just the time of the year when there is no bottom, I don't care how well you have made them. I tried to drive six or seven miles last week in Racine county, but it was impossible, and the roads have been graveled there for forty years, but there was no bottom to any of them because there was too much water in them. We are just passing now from winter to spring, shortly the water will go out, the ground will settle and we will have a good system of roads. I don't know any section of the whole state where they are better on account of this condition of the soil that admits of the water getting out of it.

Mr. Goodrich—The spirit moves me to say a little something. Just as long as you have dirt roads and haul heavy loads with narrow tires, you will have mud at certain seasons of the year. Mud is the greatest impediment to travel that we have. Mud is made by mixing clay and water, and it needs some implement to mix the clay and water together to make the mud. Down at Fort Atkinson we have got a man that is in the business of making mud, and he makes the nicest, slimiest, stickiest mud that you can find in the country. He has an implement to mix the water and the clay, and that implement is a wheel that looks just like a narrow-tired wagon wheel. With that he can make mud with less expenditure of power than in any other way. The inventive genius of man has never contrived anything that will make mud faster and cheaper than a narrow-tired wagon wheel working with clay and water. Now, then, how do you make a hard, smooth surface? By going over it with a roller, and the heavier weight there is on the roller the smoother and harder it makes the road. If we use no implement on the road but rollers, we would have no muddy roads; we would have nothing but the feet of the horses to cut it up, so we want to devise something as near rollers as possible, and we can have a sort of cross between the rollers and the narrow-tired wagons and it will do a great deal of good. As long as the law permits it, there will be men who will insist upon going over the roads with heavy loads and narrow tires, and of course they will cut it up and spoil it unless we can stop them.

Mr. Atkinson—Most of the farmers that use narrow-tired wheels are down in Jefferson county. Very few of them come here.

Mr. Goodrich—We have driven out all such men and they have taken refuge up here in the woods.

Mr. Atkinson—What we want to know is this, we have plenty of mud here, it is easy to make mud, but we want to know how to make the best possible roads for the least possible money, and if you can educate our people all over the state to appropriate a little bit more money for the roads, and to use the proper amount of machinery, you will have done a good thing.

Mr. Harrison—You use the harrow

and the roller on the farm, and I supposed you understood that is what you want on the road.

Capt. Arnold—We have in this part of the state the best roads there are in Wisconsin in proportion to the advancement of the people. The smart men all come up this way to live. pretty near, and the condition of the roads is always an indication of the intelligence of the people. Now, I want to ask you, after these roads have been properly graded, you say a roller should be used. About how heavy a roller would you recommend for an ordinary country road?

Mr. Harrison—The weight of the roller depends sometimes on how much money you have to expend on one, or the kind of material and so on. The very best roller, all things considered, is a ten or fiteen ton roller, though one from three to five tons will do very good work; some fine roads have been built by the latter kind. I have seen a good earth road made by using an ordinary farm roller weighted down with twenty boys.

Capt. Arnold—The men that work on the road will be willing to jump on the roller.

Mr. Harrison—Yes, it is the easiest way to earn their money. While the lighter roller is heavy enough for all ordinary purposes, a heavier roller will give quicker and better results. Always remember that the roller is "the mason of construction' and is indispensable in good road construction.

Adjourned to 7:30 p. m.

## EVENING SESSION.

**The Institute met at 7:30 o'clock. Mr. L. E. SCOTT in the Chair. Music, Orchestra.**

## AGRICULTURAL EDUCATION.

**R. A. MOORE, Wisconsin College of Agriculture, Madison, Wis.**

We live in a progressive age. Rapid advancement is being made along all lines of effort and rapidity and perfection seem to be the watchwords. We can no longer utilize the methods used by our forefathers, as competition and custom have forced the old methods to give way to new and improved ones. American enterprise and ingenuity have swept rapidly across our continent and carried the banner of progress to other countries, thus affecting the entire world.

### A Glance Backward.

Let us look back for a moment in the history of our nation and note the varied causes that have influenced the rapid transitions made in various professions and occupations.

**Students Judging Sheep.**

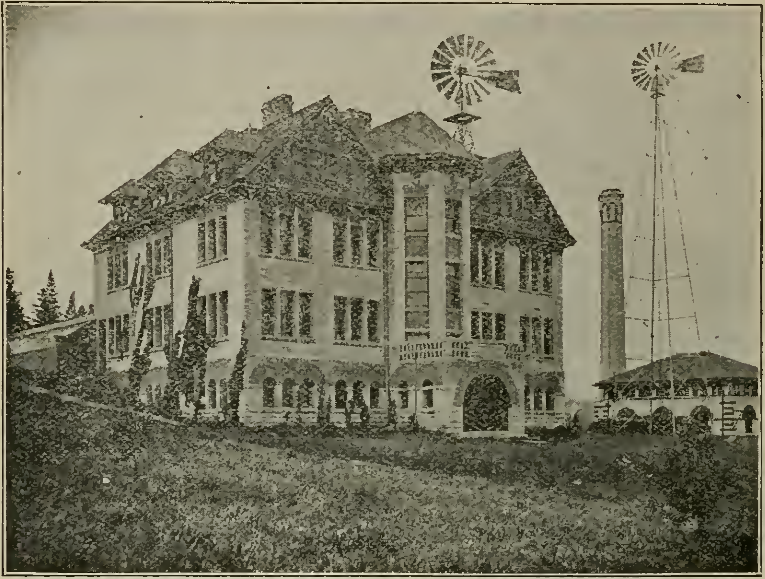
This view, in the rear of the stock-judging pavilion, shows the students judging mutton breeds of sheep.

The sturdy character of the people who came to our shores, to seek for themselves homes; our vast resources of natural wealth, and our free institutions of learning have been instrumental in a high degree for the development of our country.

Previous to the last half century, very little thought had been given to agricultural education; our fertile plains in the Mississippi valley seemed to say come west young man and grow up with the country; our great forests of the north extended an invitation to old and young, accompanied by inducements that could not be rejected.

The fisheries and the mines had their attractions, as well, and the early settlers drifted into the walks of life that seemed to offer the best returns for the time and energy expended. Our increasing numbers in the east, through emigration and otherwise, gradually swept westward, grasping the many opportunities that lay open to them in the western states, and for many years no semblance of congestion in population was noticeable.

Our fertile soils, our vast forests, our great fisheries, seemed to invite the settlers to a system of plundering which was put into practice regardless of consequences. This trend of affairs could not go on forever and it soon became apparent that the rapidly increasing population could not forever live off from the bounty of the land without replacing something in return.



**U. W. Horticulture- Physics Building.**

The departments of Horticulture and Agricultural Physics are located here. Three large greenhouses are attached to this building.

### Establishment of Agricultural Colleges.

Justin S. Morrill, the representative from the state of Vermont, viewed with alarm the tendency to rob the country of its natural resources and felt that the only salvation lay in the education of the masses. He felt that the unsystematic methods pursued should be replaced by scientific thought and proper method of application. In 1858 he framed a bill for the establishment of agricultural colleges. This bill provided that 15,000 acres of the public domain should be given to the states for each representative in congress for the purpose of building and maintaining a college of agriculture and mechanic arts. The bill passed but was vetoed by President Buchannan. It was brought forward again in 1861, providing this time for twice the amount of public land and again passed by congress and was sanctioned by President Lincoln.

By this act a vast area of land was given for the purpose of securing for the states a permanent interest-bearing fund, the income of which was to be used for the purpose of instruction in agriculture and the mechanic arts. Wisconsin got 240,000 acres, which sold for $300,000, one-third of the income of which goes to the College of Agriculture. The total fund received by all states from the Morrill act up to 1899 was $10,000,000 and 1,240,000 acres of land still remained to be sold.

Twenty-five years after the passage of the land grant, the United States Bureau of Education reported that forty-eight institutions had shared in the benefits of the act.

Previous to the passage of this measure, schools had been established for lawyers, doctors, and professional people in general, but nothing had been done in the way of providing higher education for farmers and mechanics, upon whose intelligent application of thought the welfare of our country so much depended.

The prevailing idea in those days, and to some extent yet, was that the intelligent young men from the country should be fitted to take up a profession in order to raise themselves in the estimation of the public. No training seemed necessary for the farmer, any stupid dolt was thought capable of embarking in agriculture.

Audience at Summer Institute held at Poplar, Douglas Co., June 10, 1903.

Very little thought was given to the intelligent management of the farm and the young people soon looked upon the farm as a tread mill to wear out an obscure existence. Many sought more congenial labor and surroundings by going to the cities and thus the country lost its most intelligent class of young men, who carried their energy and intelligence into the various vocations of city life.

Horticultural Laboratory U. of W. Students studying plant life.

"Mr. Morrill's idea as his many speeches show, was that the liberal education of the industrial classes should make their pursuits professions and should liberalize the industries and arts of life. This is really the central and controlling thought of the whole scheme, to bring the light of learning and the aid of science to bear upon these pursuits and callings which, hitherto regarded as illiberal and wearing the badge of inferiority, would thus be lifted to the plane with the other professions and confer equal respectability upon their members."

Many of the states receiving the government grant of public lands sold them at low rates in order to attract settlers and consequently received a sum so small that a beginning could not even be made for the purposes for which the grant was intended.

The training of people in agriculture seemed so absurd that in many states the funds were absorbed by the state universities in giving instruction in other lines of work.

## Slow Growth of Agricultural Education in Wisconsin.

So little attention was given to agriculture in Wisconsin that though an agricultural department was established in the university in 1866, it was not until 1878 that the first student was graduated from the institution. This fact was regarded as a great achievement by some and was treated with ridicule by others.

A department of Agriculture was established in 1866 and two years later Professor W. W. Daniells, now chemist of the university, was made agriculturist, but, having no equipment and little means for acquiring any, labored under many difficulties in starting the grand work which was to bear such bountiful harvests in future years.

### Organization of Wisconsin College of Agriculture.

In 1880 Professor W. A. Henry was appointed professor of agriculture and set about to devise ways and means of organizing a college, which was accomplished in 1888, when the department of agriculture through the action of the Board of Regents became the College of Agriculture.

Previous to this in 1888 appropriations had been secured from the state for experimental work and the foundation of the present Experiment Station laid.

### Establishment of Farmers' Institutes.

In 1885 the state made an appropriation for the Farmers' Institutes and the great moving school for farmers which has been instrumental in a marked degree in building up the agriculture of Wisconsin was established.

### Passage by Congress of "Hatch Act."

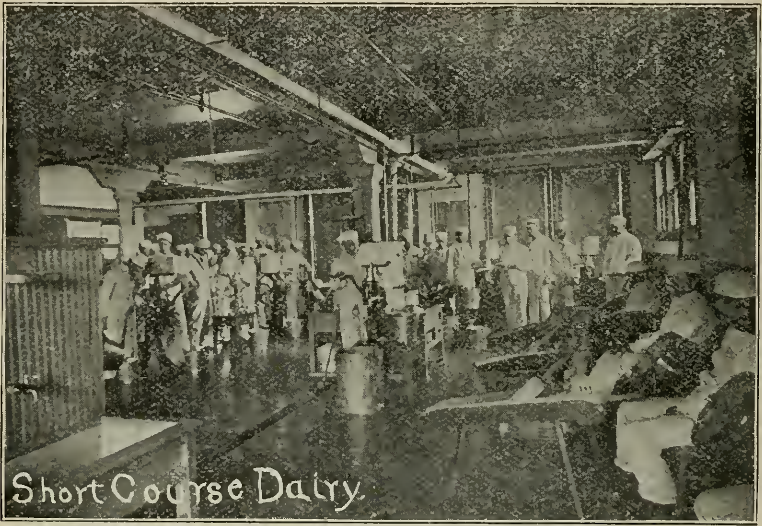
In 1887 a bill was passed by congress known as the "Hatch Act," by which each state received $15,000.00 annually for the maintenance of an Experiment Station. A little later, in

Students Judging Horses.

Two professors and four instructors have charge of the work in animal husbandry. Much time is given to the judging of farm animals.

1890, the second Morrill Bill was passed by congress, whereby each state now received $25,000.00 annually from the government for the maintenance of the College of Agriculture and Mechanic Arts.

We see by the action of the United States government in providing for the Experiment Station and the College of Agriculture that it deemed the subject of farming a most vital one, worthy of national attention.


Short Course Dairy.

### Results of Careless Methods of Farming.

We also see that through careless methods of farming the soil had been robbed of its fertility and would no longer produce paying crops, as in former years, without the use of expensive fertilizers, the forests were being depleted for the purpose of building cities and railroads and the fisheries exhausted by the wholesale methods of extracting the fish from the rivers and waters of the great lakes.

It became apparent to all that the people of the United States and of our state in particular must and surely were by force of circumstances to become largely an agricultural people, dependent upon the farm for support.

Professor Henry early conceived the idea of making science play an important part in our agriculture and organized our college, embracing the following divisions of instruction and investigation:

1. Experiment Station.
2. Courses of instruction at the college which comprise:
    - (a) The Graduate Course in Agriculture.
    - (b) The Long Course in Agriculture.
    - (c) The Short Course in Agriculture.
    - (d) The Dairy School.
3. The Farmers' Institutes.

### The College of Agriculture.

The College of Agriculture, as previously stated, is supported jointly by the United States government and the state of Wisconsin.

### The Wisconsin Experiment Station.

Since the establishment of the Experiment station in 1883, nineteen annual reports and ninety-nine bulletins have been published and copies sent to farmers of the state whose names are on the free mailing list. The reports and bulletins contain full information relating to the experiments carried on by the station. During the year of 1902 the Experiment Station sent out over 11,000,000 pages of printed matter free to Wisconsin farmers.

Testing Cows for Tuberculosis.

In the bacteriological work especial emphasis is given to the application of the tuberculin test for bovine tuberculosis.

### The Free Mailing List.

At the present time there are about 12,000 names on the free mailing list. Farmers and other residents of the state interested in progressive agriculture can have their names entered on the list by sending request to the Experiment Station at Madison.

### Babcock Test and Wisconsin Curd Test.

The Babcock Test and the Wisconsin Curd Test, now used throughout the world, are inventions of the Experiment Station and show in a marked degree what science can do for agriculture. By driving out poor separators, exposing imperfect churning, weeding out poor dairy animals, and detecting adulterated and tainted milk, the Babcock Test and the Wisconsin Curd Test save annually to the dairymen of Wisconsin not less than $800,000.00, much more than the running expenses of the entire state university.

### The Farmers' Institutes.

The Farmers' Institute, established in 1885, is a school for the farmers held in rural communities, the object of which is to carry practical and scientific knowledge concerning agriculture to the most remote parts of the state.

During the winter over one hundred two-day meetings are held in farming districts, and during summer a score or more one-day meetings are held in the newly settled districts of the northern portion of the state.

Sixty thousand copies of the Farmers' Institute Bulletin, a book containing three hundred and twenty pages, are published annually and distributed at the Institutes; eight thousand bound copies are placed in the libraries of the common schools of the state.

### The Short Course in Agriculture Established in 1886.

A course of instruction covering two terms of three and one-half months each, given in the winter, especially designed to meet the wants of young men who wish to gain a better knowledge of practical and scientific farming that they may become intelligent farmers, stockmen, dairymen, gardeners, etc. Since the establishment of the Short Course, 1.468 students have pursued the studies; of this number 266 have come from other states, 1,202 from Wisconsin.

Beginning with an attendance of nineteen students in 1886 the number gradually increased. reaching an enrollment of three hundred for the winter of 1903. Fully three hundred calls are received annually at the college for the services of the young men who have taken the Short Course in Agriculture, and many former students are placed in positions as managers and assistants of dairy, general and stock farms. With very few exceptions all Short Course students return to the farms with a determination to place agriculture on a higher plane. Already we find some of the most progressive farmers, fruit growers, and live stock men of Wisconsin in the list of former Short Course students, prosperous and happy, willing to continue in their chosen vocation.

### The Wisconsin Dairy School—Established in 1890.

Since the establishment of the Dairy School in 1890, 1,394 students have been in attendance and have gone forth to help build up the dairy industry of Wisconsin. That they have contributed their share in placing Wisconsin in the front ranks as a dairy state can be fully realized when we note that six hundred of the cheese factories and creameries of Wisconsin were last year operated by former dairy students.

### In Conclusion.

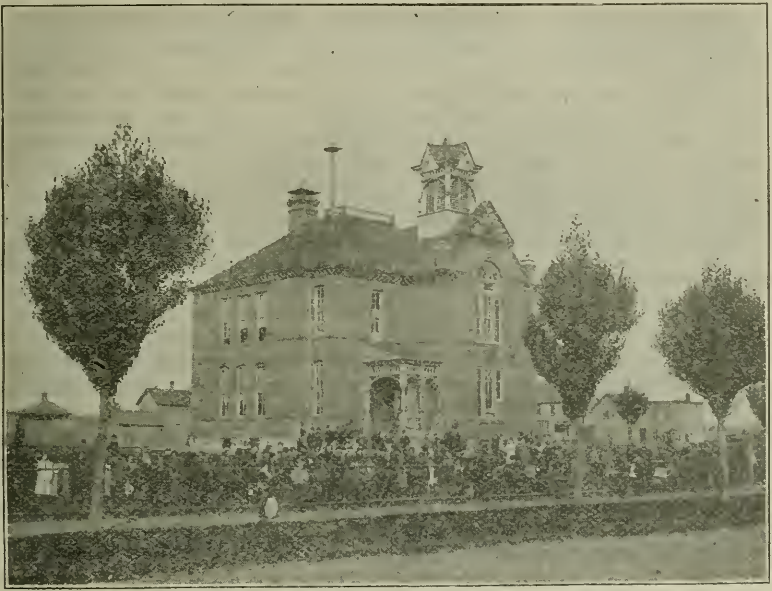
In conclusion I wish to state that through the aid of science we have been able to accomplish much along agricultural lines and place farming on the true plane where it justly belongs.

We note with pleasure the advent of the electric lines which are now being built in various parts of the state and the advancement already made in establishing rural delivery and systems of rural telephones in various communities. Another move is now being agitated, which we trust will be the most important of all, and that is the effort put forth by the educators of the state in behalf of consolidation of rural schools, thus putting in reach of every boy and girl on the farm the same opportunities for systematic and higher education accorded their city cousins. In these schools with properly trained teachers, a course in agriculture could be introduced that would bring directly to the home and fireside the important knowledge so necessary to interest our young people in the vocation that nine-tenths of them follow and make farm life more sociable, more interesting and more desirable than has been experienced in the past.

# CONSOLIDATION OF RURAL SCHOOLS AND TRANSPORTATION OF PUPILS.

C. P. CARY, Supt. Public Instruction, Madison, Wis.

I could not ask at this time a pleasanter task than that of eulogizing our public school system, and particularly our system of district schools. The good that it has done and continues to do in the way of raising the general level of intelligence of our people, Americanizing our foreign population, leveling class distinctions and increasing the welfare and happiness of our citizens, cannot well be over-estimated. But it is not my purpose tonight to indulge in eulogy, but to point out some of the shortcomings and defects of our rural schools, and so far as I am able to point out what appears to me to be the most hopeful and speedy remedy. It is not to be understood that I am to present a panacea for all our pedagogical ills, or even to present a remedy that is free from all objection. When we study the country schools as they are today, we find that in many instances the attendance is exceedingly small and very irregular; the equipment poor; the enthusiasm and school spirit at a low ebb and the teachers ill-prepared for the work they have undertaken. In many districts the people have been accustomed to poor schools for so long that they have come to take them as a matter of course and their ideals of what a school should be are so inadequate



Photograph of Public School, Rice Lake, Barron Co., Wis.

that it seems almost a hopeless task to attempt to open their eyes to the situation, and to stimulate the necessary activity to bring about the needed changes. You will bear in mind that this is not a wholesale attack upon our district schools. Many of them are in fine condition and the public sentiment is practically all that could be desired, and yet the unfortunate conditions just described are exceedingly common.

Educators sometimes indulge in discussion of the question whether the district schools of today are, upon the whole, better than they were a generation ago, some taking the negative and some the affirmative side of the question. But whatever the facts may be, no educator has said or will say that the country schools, as a whole, have kept pace with the rapid improvements made during the last quarter of a century, especially during the past ten years, in our graded schools.

### Irregular Attendance One of the Evils of the Present System.

In the mere matter of attendance we find that in the city schools the percentage of daily attendance, based upon the enrollment throughout the state of Wisconsin, is seventy-six, while the percentage in the country schools is about fifty-seven. It must also be taken into consideration that in the counties there are under the jurisdiction of county superintendents many villages and cities of considerable population, such as Bayfield, Washburn, Hayward, Platteville, Richland Center, Lancaster, Darlington, Evansville, Elkhorn, Waukesha, and Marshfield. In these cities and villages the percentage of average attendance, based upon the enrollment, is probably as large as it is in any of the cities working under the jurisdiction of city superintendents. It is also fair to consider that of the cities under city superintendents a considerable number have no larger population than some of the cities thus enumerated. Among these may be named Brodhead, Reedsburg, Stanley, Wauwatosa, Berlin, Hudson, Monroe, New London, Ripon, Whitewater, and Rice Lake. Assuming that in many of the cities under the jurisdiction of county superintendents the percentage of daily attendance, based upon the number of persons enrolled, is equal to the average daily attendance in cities under the city superintendents, there is every reason to believe that the schools outside of the villages and cities have an average daily attendance of approximately fifty per cent. of the enrollment. This means that the daily attendance is irregular and that very few of the pupils enrolled are able to show a perfect atendance record. The fact of this irregular attendance is a positive and serious drawback upon all rural school work. It must be apparent to every one who studies into the matter that a pupil who was absent yesterday and is present today demands an extra amount of individual attention from the teacher in order that the work of the class in yesterday's recitation shall be made clear to him today, so that he may keep his place in the class. This embarrasses the teacher's efforts and hinders the progress of the pupils who are regular in attendance. Not only this, but it rapidly diminishes school spirit in the school as a whole.

### Waste of School Funds.

There are 6,800 school districts in the state, each with a schoolhouse of greater or less value, furnished with heating apparatus, school furniture, etc. A teacher is also in charge, but owing to the irregular attendance, no matter what the cause may be, whether through carelessness or indifference of parents, distance from school, bad roads, bad weather, sickness or truancy, the money expended for public school purposes is not so thoroughly utilized as it should be. Indeed, it has been estimated that not less than $1,600,000.00 is expended annually for teachers' wages, fuel and janitor service from which the people of the state derive no direct benefit. Is there not some way by which a considerable part, at least, of this excessive and fruitless sum can be turned to account and made to return reasonable service to the state? Thoughtful educators have for many years been trying to solve this problem, not only in this, but in other states. It is needless to say that no intelligent student of the situation considers it possible, in the nature of the case, to secure a perfect attendance or to utilize fully all the expenditures made for public education, but the discrepancy between what might reasonably be expected and what actually is secured is so great that it is deserving of careful study and earnest solicitude on the part of all who have the welfare of our state at heart.

### Better Educational Facilities Necessary for the Farmer of Today.

Were I a pessimist I could easily picture to myself, in view of the conditions to which reference has just been made, and others still to be enumerated, a deterioration in the relative intelligence, business ability and skill of our country population when compared with that of our larger villages and cities. There have been times in the history of the world when the farming population was distinctly inferior from every point of view, except, perhaps, that of morals, to those who dwelt in cities; and we have noted in our day a tremendous increase in cities as compared with the increase in rural population, and this, when interpreted, means in part that there is a rapid exodus from the country into the city, and often those who leave the farm are those who are best educated and have the keenest and brightest intellects. But I am not a pessimist. I believe the country will hold its own with the city in the long run, and that everywhere there will be an awakening to the fact that we must utilize to the utmost in our country life the natural advantages we possess.

Agriculture has been called the science of sciences and the art of arts, and when science and art come to be the common heritage of the farmer then will the farm be a place of health, of joy in living and prosperity. Except under peculiarly fortunate circumstances, the farmer of today who is not a reader of agricultural literature, who is not able to interpret and apply the scientific discussions relating to his business, who does not understand and use the newest machinery, who does not pay careful heed to the waste products of his farm, who does not secure the best breeds of stock, the best varieties of fruits and the best seeds for planting, is a failure in his business.

It has recently been estimated that in the United States there is an illiterate agricultural population aggregating three millions, and by illiterate is meant inability to read and write. Professor A. C. True, director of the office of Experiment Stations, commenting on this fact says:

"It will thus be seen that illiteracy is one of the great obstacles to the progress of agriculture in the United States. This inert mass of absolute ignorance constitutes not only a menace to our social and political institutions, but it prevents the introduction of better crops, better methods of cultivation and better farm machinery in many sections. In these regions, even if intelligent farm managers are available, their efforts to improve agriculture are largely defeated by the stupidity of the only farm laborers who can be procured to perform the necessary routine operations."

And he says further, "that it is very important that the agricultural people who study the problems of the public schools should become alive to the relation of these schools to the progress of their art."

I believe that he is right when he further adds,

"When every other industry is allying itself closely with the schools and seeking changes in the school course which will be to its benefit, it will not do for agriculture to hold aloof from the educational movements of our time and attempt to run a twentieth century agricultural system on the basis of an eighteenth, or even nineteenth century school system."

The problem set for us in relation to cur country schools is to secure better teachers, more educational enthusiasm, better equipment, better attendance, better courses of study, more healthful and artistic school environment and conditions.

### Consolidation the Remedy for Some Existing Evils.

State Superintendent Emery, some years ago, in wrestling with this problem, came to the conclusion, in view of his own study and the experience of the eastern states, that the best solution lies in the direction of the consolidation of school districts and the transportation of pupils and, in conformity with this idea, he framed a bill which subsequently became a law which, under powers of districts, reads as follows:

"To authorize the district board to suspend the district school for such length of time as they may deem expedient, and to the best advantage of the district and pupils residing therein, and to arrange with any adjoining or other district or districts for the instruction of persons of school age residing therein, and to arrange with any adjoining or other district or districts for the instruction of persons of school age residing in the district during the time when the school may be suspended, and to provide for the transportation of pupils residing more than one and a half miles, by the nearest travel road, from the schoolhouse of the district with which said arrangement may be made, and to include in the taxes voted at the annual meeting the amount of the expense incurred in providing for the transportation and tuition of children in an adjoining or other district or districts; to vote a tax for the purpose of providing for the free transportation of all children residing in the district who live more than one and a half miles by the nearest travel road, from the schoolhouse of such district."

A subsequent legislature amended this law so as to remove the clause which places a limit upon the distance pupils may be transported, so that now all pupils residing in the district may be transported to and from the schoolhouse in which the arrangement for their instruction is made.

In the year 1900 a committee that had been previously appointed by the State Teachers' Association, recommended (1) that the system of direct aid to high schools be extended to graded schools not connected with high schools. (2) That state instruction be provided for supervision and perfection of organization in these schools, to the end that they may become in every sense of the word higher rural schools, and thus bring equally to rural districts a realization of higher ideals. Later this suggestion was framed into a bill and the bill became a law. Under this law $60,000.00 annually was granted as state aid to graded schools and two inspectors were appointed by the state superintendent, whose duty it was to give careful inspection to the work of these schools, a large percentage of which have but two departments. As the consolidation of districts frequently makes it necessary to establish a graded school of two or more departments, the bearing of this law upon the matter now under consideration is readily seen. Furthermore, a course of study for such schools was prepared by the state superintendent and put into operation.

### Advantages Resulting from Consolidation in Massachusetts.

But I must hasten to discuss the advantages that result from consolidation, not merely from a theoretical point of view, but from the standpoint of experiments already tried. The rapid movement of population some years ago from the east to the west forced upon the school districts of Massachusetts and other New England states this problem that we are now discussing, and their efforts in the direction of consolidation afford us valuable lessons. I shall take Massachusetts as a typical state in the east, and give a brief account of the progression of consolidation and transportation, as I find it in the last report of the Commissioner of Education.

In 1874 Quincy closed two schools and transported the children to other schools. In speaking of the Quincy experiment, Mr. Rockwell, who had been a member of the school board for many years, said:

"For eighteen years we have had the best attendance from the transported children; no more sickness among them, and no accidents; the children like the plan exceedingly; we have saved the town at least six hundred dollars a year; all these children now attend a well equipped schoolhouse at the center; the schools are graded; everybody is converted to the plan. We encountered all the opposition found anywhere, but we asserted our individual and local rights and accomplished the work; I see no way of bringing the common schools up but to consolidate them."

From another township came the following statement:

"Once when a man wished to sell his farm he advertised 'a school near.' Now he advertises, 'children conveyed to good schools.' Farms sell more readily now. Consolidation is generally partial, in a few towns, complete. Most frequently it has been accomplished gradually; in some instances at one stroke. In twenty-five instances pupils belonging to higher grades are taken to the high school building. It is almost the unanimous testimony that the attendance is improved by conveyance of pupils, and in respect to the health of children, the majority say that there is no noticeable effect, though a large number say that the effect is good because there is less exposure to rain, snow, cold weather, sloppy or muddy travel, consequently few colds; a few speak of the unfavorable effects of cold dinners hastily eaten, and a few others say, 'not healthy;' much depends upon the vehicle and driver."

I quote a few of the favorable comments made by those who were consulted in the preparation of the article before mentioned. Better ventilated rooms, hence more healthful; cost less for repairs; better janitor service; pupils better classified; three teachers in the union school do the work of five in ungraded schools; petty and local jealousies are lost in the larger school; pupils are more studious in the graded schools with only their classmates with whom they must compete; greater enthusiasm and incentive. Pupils become better acquainted with people, hence less bashful and awkward. The time lost by superintendent on the road is largely saved by consolidation of schools. It becomes possible to give all the pupils the advantage of special teachers in drawing, music, etc. Our people would as soon think of having district churches as district schools. Association with others whose lives are less restricted than their own is a gain in social graces. Much is to be expected in moral influences, as conditions are better in graded than in the ungraded schools. This is especially true as regards out-buildings or basements in their sanitary arrangements, and the oversight had in and about them,—in other words, the system makes for economy and efficiency.

I have here purposely omitted a few

adverse criticisms with the intention of mentioning them later on.

### Cost of Consolidation.

The cost, as reported from the towns, is less in sixty per cent. of the cases and the results better; in twenty-three per cent. the cost is the same, but results better; in eight per cent., cost more but results not stated; eight per cent., cost less, but results not stated. It will be noted that in only eight per cent. of the cases the cost was reported greater after consolidation.

### Some Objections to Consolidation Plan.

The following obejections are offered by some of the Massachusetts school committeemen to the consolidation plan. Some of these objections apply to the plan itself, and some apply to specific cases only.

Some object to having small children away from home so long. Some think it will reduce the value of their property in the rural districts. Some do not think that drivers can be obtained who will take proper care of the children. Some think there is a tendency to grade too much, and believe that twenty-five pupils and an efficient teacher can be made equal to any closely graded school, and better than most of them. In some cases the distance is too great, the roads bad, or blocked in winter; not room enough in the center buildings for all pupils. Some think that where the union school is in a village that the country children learn bad habits from the village children. Some people show strong opposition to the machine-like system of conveying pupils. I give at length the conclusion of the writer.

"While the weight of opinion is decidedly in favor of consolidation of schools, as being in the line of economy and efficiency, there are strong arguments in favor of the fair-sized, well-organized, thoroughly taught ungraded school. Small, isolated rural schools must exist in some towns of the state for years to come. The children are not responsible for the unfavorable conditions in which they are placed, and they are morally and legally entitled to a good education. Some of these schools are taught by women of rich culture, and of large previous experience in other educational fields. They are now 'home talent' because of the love and care needed by aged parents. The teaching and character building in these little schools are of rare value. There are other teachers of exceptionable abilities who will for a reasonable compensation do needed work in communities thus situated. The state is in duty bound to aid the town in securing to every child good educational advantages. If such influences of frugality and industry as characterized the home life in the country in former days can be kept up and supplemented by excellent teaching, these isolated rural schools may do good work, even if they are denied the advantages of consolidation."

### Arguments for and Against Consolidation.

In the year 1900 the state superintendent of Indiana sent out a set of searching questions to all the county superintendents of the state for the purpose of getting information regarding consolidation and the transportation of pupils. The replies showed that forty counties had already begun the work of collecting pupils in larger groups by transporting them. The replies from the county superintendents are included in the report of the United States Commissioner of Education for the year 1900–1901. I can do no more than give a general summary of the answers. Fifty-six superintendents reported that the sentiment among the school boards for consolidation was favorable and fourteen reported unfavorable. I quote at length the report of the superintendent of La Porte county, taken at random, although I am under the impression that it is rather more favorable than the average report.

"1. The matter of consolidation of schools has received much attention in this country within the last three years, and trustees are, so far as I am able to learn, unanimously in favor of abandoning small schools and transporting pupils at public expense to village schools or other schools in the townships.

"A resolution by the county board favoring the abandonment of all the schools with an enrollment of less than nine pupils was spread upon the record of March 6, 1899.

"2. The plan has given general satisfaction to patrons and school officers, and made a saving to the townships of over half.

"3. I would consider the following advantages: (a) Much cheaper, saving in heat, school apparatus, and repairs in buildings in case school had been opened in the abandoned districts. The saving must be greater in case several schools are abandoned in the same township. (b) Attendance has been increased and cases of tardiness reduced. (c) Pupils' health has not been impaired by wet feet, etc., and better sanitary conditions have been possible in the school. (d) I believe better roads will follow. (e) It will give a longer term of school under better conditions. (f) Closer and more efficient supervision. (g) It will give a graded instead of an ungraded school, where each pupil will have the advantage of personal contact with his instructor, and the interest and emulation accruing from larger classes instead of being a member of one of eight divisions under the same teacher, and, as in many cases, the only member of his class in the school. (h) It will give each teacher an opportunity to specialize in her particular grade; give her a chance to select the work which she best likes and is most efficient in. (i) Make a united whole of township schools and bring them more nearly on a standard with city schools.

"I would consider long distance, in some cases, and bad roads, in some localities, as disadvantages.

"In no case have all the schools of a township been consolidated in this county. Transportation for the small schools has cost from $75.00 to $160.00. The cost of maintaining the abandoned schools would have cost—teacher, $320.00; fuel, $25.00; apparatus and repairs, $35.00; total, $380.00.

"4. Patrons, as a rule, remonstrated against the plan at first, but in no cases have substantial complaints been made. After the plan is once in operation and patrons see its advantages they show a disposition to advance the cause.

"5. Pupils have not been transported more than three miles in this county at any time.

"6. Worden school, in Noble township, was closed last fall and a team hired to transport pupils a distance of about three miles for $1 per day. The wagon used was to be covered and to travel on schedule time. Patrons were generally pleased until a boy or young man was hired as driver. Young man proved incompetent and a man was employed. In this particular case had the driver been competent from the first, and the wagon better equipped, the plan would have been highly successful. All is running smoothly at this time, and more schools in the same township will probably be closed in the near future.

"7. I think we can safely say that consolidation is the order with our trustees, and small schools will continue to be abolished as rapidly as it is possible for us to do so. We aim to make the change gradually at first."

In both Massachusetts and Indiana, I find the general sentiment is against the closing of the school where there is a good attendance, say twenty-five pupils or more, and where the school sentiment and the financial ability of the district are such as to support a good school, employing a well-trained, competent teacher. Under such circumstances a teacher should receive from $40.00 to $60.00 per month.

### What Has Been Accomplished in Wisconsin.

In our own state efforts of consolidation, as we here understand the term, were commenced during Superintendent Emery's term of office, as before mentioned. His successor, Superintendent Harvey, continued the agitation on this question by means of bulletins, public addresses, and through the visitation of country districts by institute conductors. Some results have been secured, but the movement may still be regarded as in its infancy. The counties that have taken the lead thus far have been Chippewa, Dunn, Gates, Wood, Jackson, Iowa and Oneida. Wherever the plan has been tried in this state, with few if any exceptions, the report is that public sentiment grows rapidly in its favor, though more or less opposition is always encountered in the beginning.

### Mode of Transportation and the Cost.

In transporting pupils the conveyance used is a covered spring wagon with seats running lengthwise, and large enough to accommodate twenty or more pupils. Seats and back are cushioned, the floor carpeted, and heavy lap robes are used. In cold weather a heater may easily be supplied. In one instance in Indiana one man managing two hack lines transports about forty children from two to four miles at the rate of $3.00 a day for the two. It is further stated that four-fifths of a cent a mile is the average cost of transportation per pupil. In Ohio the average price per day per wagon is $1.25 and the length of the longest route is four and three-quarter miles. In Winnebago county, Iowa, the compensation paid drivers is $40.00 per month in some cases, and in others $25.00. For this amount those who take the contract are required to furnish properly covered, strong, safe, suitable vehicles, subject to the approval of the board, with comfortable seats, and a safe, strong, quiet team with proper harness, with which to convey and collect safely and comfortably all the pupils of school age on the route, and to furnish warm, comfortable blankets or robes sufficient for the best protection and comfort for each and all of the pupils to and from the public school building and their respective homes. Drivers are required to follow a time schedule and to drive and manage their own teams, to refrain from the use of profane or vulgar language and the use of tobacco. They are not permitted to drive faster than a trot, or race with any team, and are required to keep order and report improper conduct on the part of the pupils to the principal of the school or president of the board. The rates for transportation in Wisconsin are as low or lower than the rates above quoted.

### Some Advantages to be Derived from Consolidation.

Personally I am strongly in favor of the consolidation of schools whenever and wherever the conditions warrant it. And the conditions always warrant it whenever the school population is small, the salaries paid teachers low, and the condition of the roads such as to render transportation feasible. In sparsely settled districts, where distances are great and roads bad, the difficulties are serious, if not insuperable; but in all portions of the state where the population is sufficiently well grouped transportation can be established to the great advantage of all concerned. There is not the slightest doubt that when properly managed, the transportation of pupils is better from the point of view of morals and of health than where pupils are obliged to walk to and from school. It has been fully demonstrated that with transportation pupils are never tardy and rarely absent. Those of us who have attended **country** schools well know that the morals of children are often undermined by the evil influences at work where children go back and forth unattended, by two's and four's and larger groups. Again, in stormy and severe weather a careful parent is scarcely willing to allow his young children to walk any considerable distance to and from school, and yet it is frequently a great inconvenience and loss of time to prepare a team and take the children back and forth. So far as the school itself is concerned, the consolidated district can and does secure and retain better teachers, better heating and lighting, better desks and apparatus, better grading, longer term of school, greater emulation and school spirit, and greater impetus is given to pupils to complete the course of study and even to carry on work in higher institutions of learning.

### A Vision of the Future.

I have sometimes indulged in a vision of this sort, and I think I shall live long enough to see it come true in many rural communities. A central modern school building, artistic in its appearance, within and without; well equipped in all necessary apparatus; a thoroughly trained and experienced teacher in every department; a course of study that shall include opportunities in manual training and in domestic science and domestic arts, in the elements of agriculture, or the elementary sciences that underly agriculture; a plot of ground of not less than five acres properly divided off into grounds for sports and games, for gardening, for experiments in agriculture, for experiments with fruit, and for shaded lawn; and, leading out from this in all directions, well graded roads, and teams transporting pupils from home to school and from school to home; and on this plot of ground I also see a neat cottage designed for the home of the principal, who shall have charge of the grounds and buildings, not only during school but during the vacation period. This building must include a gymnasium with bath-rooms, and it must include an assembly room and library, and here frequently in the course of the winter will assemble the people of the community for lectures and entertainments of various sorts.

Are such things so far beyond the possibility of attainment as to make all this but a vain dream? No. There are scores of rural communities in Wisconsin today where just such conditions could be brought about, and that too without greatly increased taxation, were the matter undertaken by the people with intelligent foresight and energy. But until we have worked in a humbler way, and have demonstrated by instance after instance the benefits of consolidation, we can scarcely hope to see even in one instance consolidation upon so ideal a scheme as has just been described.

I bespeak the interest and efforts of all in disseminating facts regarding transportation and in urging consolidation wherever the conditions for it are favorable. No more generous or elevating thought can fill the minds of men than that of caring for the education and culture of the young.

"The riches of a commonwealth
Are free, strong minds and hearts of health,
And, more to her than gold or grain,
The cunning hand and cultured brain."

## DISCUSSION.

The Chairman—This subject of the consolidation of schools and the free transportation of scholars is one of too much importance to pass over lightly. We have in this audience men from all parts of the state who have thought over this subject, as well as guests from other states, who have been making observations along these lines. We will have just a few moments of good, sharp discussion on this subject.

Question—What is the longest distance that pupils are transported to school?

Prof. Cary—In Indiana, I think about four miles. I do not know in the state of Wisconsin just how far, probably three or three miles and a half. It is only a question of time you understand. Pupils want to get into the school by nine o'clock.

A Member—I used to make three miles on foot.

Prof. Cary—Yes, so did I.

Mr. Rietbrock—I walked three and a half. As a general rule I drove down to the meadow with my brother, and we loaded up a load of hay and fed it out to the stock and then I generally got to school before the rest did and when it was my turn to tend the fires, I had the schoolhouse warm. We generally managed to get in some ball playing before school opened too, and at the noon hour. I would rather trust a boy alone to go two or two and a half miles to school on his own feet and develop his capacity to get there than to have him ride morning and night in a covered carriage wrapped up in a lap-robe. My idea is that the country district schoolhouse has educated the men that have done the commercial business, the manufacturing business and nearly all the rest of the business of this country and have made things move. It is not the city boys or the city girls who have done that, although they do go to school from one to three months more in the year than the country children do, and when they are grown up they are educated fools. They lack to a very great extent the physical ability to carry the stuff that has been crammed into them. I think the difficulty that we have here in this state is that we have not children enough in the districts; the teachers are not good enough. Through a period of twenty-five years the population has been drawn from this part of the world into the vacant west and into the cities, because it was more attractive, and because there was an opportunity to earn more money than they could upon the farm. I know of one big institution in the city of Chicago that employs nearly one thousand country boys to peddle beer. Why did they leave the country?, Because farming through a long period of time was flat in the middle west, the great stock raising and feeding territory in the west extending over a distance of 1,300 miles from north to south and in width from three to five hundred miles, was producing beef cattle that were supplying the markets at less than one-half the price that people upon medium sized farms could afford to produce them. In the last few years things have changed. Stock farming in the middle west has become attractive again and population from this time forward will increase upon the small farms, I mean farms from 120 to more than 200 acres in extent, and upon those farms will be produced the population that will carry on the business of this country and take care of it in time of need.

I believe, Mr. Superintendent, that the remedy we are seeking lies in the improvement of the teacher and in the improvement of our little country schools. I see a great many reasons why we should cling to that system which has educated and inspired the men of this country. The great educational difficulty in this country is that children of tender age, before they have got a mind in their heads, are crammed full of book learning—reading, writing, arithmetic, geography, biology, astronomy, drawing, music, history, constitutional history and the constitution of the United States, are all crammed into children of ten or twelve years of age, and even younger than that.

Supt. McKerrow—I have hardly known whether I was really in favor of consolidation or not, but since hearing the speech of my friend Rietbrock, I am in favor of consolidating the school districts of Wisconsin to the extent that the boys may walk three miles and a half, so that we may have more men like Mr. Rietbrock.

Mr. Convey—Since the farmers are

having their innings, I propose to take a hand in this matter. I can't help feeling sorry when we have had such an excellent paper along the lines of better education to see the discussion taking this turn. Some of us had difficulty in getting an education, some of us got an education, not by means of the district school, but in spite of it, because some of us will get an education, no matter what the difficulties may be, but we know very well that the opportunities are not what we would like to have them for our children and very many of us feel that it is time to make a change so that we may have better teachers, and if this can be brought about by the consolidating system, that is what we want. One of the troubles is our teachers are not teachers really, they are making that position a stepping stone to something higher, there is no pay in it for a good teacher. Your hired girl can get as much wages as most of the teachers get. Again, look at the number of classes you have in your district schools, and you expect a district school teacher to take care of as many grades as a whole corps of teachers in your high schools has to look after. Another thing, we all want to have the principles of agriculture taught, as suggested by our state superintendent. How on earth can you introduce those new studies along those lines, which we are beginning to realize the necessity of, under the present state of affairs? These teachers have too many classes already, and we must have a consolidation of the schools, with a grading of the pupils, so that a teacher will have five or six, or possibly, even less, classes, and give ample time to the instruction of each. If you will figure up the amount of time that our teachers are required to give to their many classes, how much time can you make it that she can give of special attention to each individual scholar? Not more than a minute and a half, or two minutes. We want an entirely different system. Our educators are working for it and our farmers are setting their faces against it. Over in Michigan the Grange, which is a great educational institution, undertook to investigate this matter. In the first place, they were opposed to it, but they looked into the matter thoroughly on both sides, and in order to do so, they employed a man who was absolutely opposed to the system. I suppose he felt as our friend Rietbrock does. He spent four or five weeks investigating and he found the best system in Ohio that was found in any of the western or middle states, and he reported that those children of Ohio were being educated at less expense as compared with the entire population and that the increase of average attendance went up from 25 to 80 per cent. Can we expect to have educated people when only 25 per cent. of our children go to school?

Our school men are doing their very best under the most discouraging circumstances, but let us be sensible in this matter, at least let us investigate. In fourteen or fifteen states, where they have introduced this system, they all pronounce in favor of it; they have found it cheaper and they have enabled the children of the rural districts to get not only a common school education, but a high school education right at home where they ought to be. If I have to send my children away to school, it costs me $150.00 a year at least, and they are not at home and we all know that we prefer to have our children where we know what is going on, at home. I think this matter is in the line of direct improvement. I am an old school teacher myself, I have sent quite a number of children to school, and I know that, in the majority of cases, when the bad weather comes, you keep your five, six and seven-year old children at home, and when you send them to school the next summer, they can't tell where they left off after that period of idleness between. Our school men are on the right road to success, and we ought not to discourage them in such a way as has been done here tonight.

Capt. Arnold—I am not going to say very much, but when I hear men talking like Mr. Rietbrock and know, as I do, that that man can practice law successfully and run all kinds of business, such as sawmills and farms, in spite of the immense exertion he had to put forth to get an education, it shows what good material there is in some men, and such men call themselves "self-made" men. Now, there is no such thing as a "self-made" man. We owe a great deal to our surroundings, our environment. No man has control over where he should be born and who should be his father and mother, and in spite of all this, if he succeeds, he puffs himself up and says he is a "self-made" man.

Aside from all this, the fact stands out that we have either got to have more children, or they have got to walk faster, or we have got to carry them to school. In this state we have built up a public sentiment in favor of higher education and today we have only one-hundredth part of the children or persons of school age perhaps in our state university, and perhaps three per cent in the high schools and the normal schools. If we estimate the amount of money spent for this higher education, as compared with what is put into the common schools, we will find that our commons schools are not receiving their proper proportion of the public funds. The public favor has been turned too much towards the higher education, and our education is becoming top-heavy. Our boys and girls go through their studies and they are often presented to immature minds, which utterly fail to fully comprehend the real meanings. They go from these grades up and when they get into the high schools they really know little or nothing in those studies which are absolutely necessary for a good business education, and we find that three-quarters of the graduates of our high schools are girls, and the girls are getting away from us, pretty soon we will have to take back seats. I am getting jealous of the women; they will have to vote by and by, and we will have to stay home and take care of the children.

Now, we want to build up a better public sentiment among the farmers of the state of Wisconsin. One thing that is helping to do that is the fact that all the farmers that are well-to-do send their children off to graded or high schools and it is left to a few ignoramuses in the country to run the public school, and they hire very poor teachers, and I doubt if the common schools of the state of Wisconsin are as good as they were twenty years ago.

Mr. Rietbrock—I have never claimed that I was a self-made man, but I do claim it is good for children to be able to walk, and I do claim that there is much mischief done in trying to cram too much into young children. This subject has been agitated for years, and I have thought about it, and I firmly believe that the best results will come to the population of the state of Wisconsin by the improvement of every little, common school, make the home schools better, give us better teachers and urge the people to send their children there rather than to the parochial schools. Talk less about higher education, and give more attention to our little children, try to keep our boys and girls from drifting off to the cities, I honestly believe they would be more intelligent and able to take care of themselvs had they remained in the rural sections. I have always been in favor of doing as much as possible for the little schoolhouse and have helped to build a good many. The big ones will take care of themselves.

Prof. Borden—There is some truth on both sides of this discussion. I think Mr. Rietbrock is fortunate in having been educated in the country school, but you must remember that you cannot compare the country school of today with what it was in your time, Mr. Rietbrock. Superintendent Cary spoke of the school that he attended where they had sixty scholars, with a man teaching it, a man of culture and force, who knew the children and what they needed, and those boys came there and got something out of that school that stood by them until they grew up, got something which made them men and they went out into the world and made their places. That is the kind of school we want to have today. Right down in my county where I was born and graduated, a short time ago a girl went out there to teach and she had the total sum of one little girl as a scholar, and one boy in the fall. She was an eighteen year old girl and she got $20.00 a month. That is the condition we are trying to remedy. We are trying to take those districts where there are very few scholars and put them together with a competent teacher in charge of them all.

I say that little red schoolhouse has been the salvation of this state and will be—in the future it may be a little larger red schoolhouse. I feel that something has got to be done in regard to this country school education. You have got to put into these schools a strong teacher, and you have got to have children enough to make it worth while for the parents to pay their taxes to support those schools. You would hardly like to pay a girl or a man $45.00 a month to teach one scholar. Those conditions have come, they are here. We do not want to pamper our children too much. I agree with Mr. Rietbrock that we are stuffing the children, but in a sense we are forced to do so. Parents come to me and say, "I want my four-year old boy to enter the first grade." They almost force us to pass him from the kindergarten.

Years ago we had three months of school in winter for the boys, the boys and girls had good, hearty physiques, and the red schoolhouse was the center of the district's life, there were held the spelling matches, the socials and singing schools, and the parents and every one took hold. The parents do no such thing now. There is no one to take an interest or to keep things going. The parents send their children in to the city schools; we have got plenty of them here in the high school. What we are trying to do is simply to take four or five schools and put them into a center school in the center of the township and have the materials at hand to do good work. If any farmer or father wants his boy to walk three miles and a half, as Mr. Rietbrock advises, there is no law to compel him to ride. Personally if my boy and I live on a farm, I want him to walk.

I think we all agree with Mr. Rietbrock after all; we want to make our country schools the foundation schools. The university will take care of itself, but we want to go out into this country school, where we have thousands of children who can only go to school for a short time, and we want to build up a school that is a good one and let the boys and girls of the country districts amount to something, and then the young men and women will come back to that school. You had those good schools years ago and they turned out grand men; at any rate, the boys learned to work and do something in spite of the schools. The trouble with the city boy is that the greatest length of time he has to work is twenty minutes in the spring when he is required to whip carpets and then he rests the rest of the year. The boys from the country have learned to work from five o'clock in the morning till seven at night, and you put them at a task in school and they stick to it until they have got it. The city boy is quick, he will get there the moment we can persuade him that it is necessary for him to work and hang onto it until he gets it, and not until we can get that spirit into him will he work. The farmer boy has it trained into him. We all mean the same thing, and I don't like to see the thing diverted into the idea that the farmer is against it, because when he properly understands it and that we all mean the same thing, we will get together and talk it over and advise each other, and adopt some means to help it along, because we all want to help the children.

Rev. Joseph Brown—I presume I have seen more of the schoolhouses in this state than any other man in this room. I have traveled three hundred thousand miles in Wisconsin and have realized that there is great room for improvement in the little schoolhouses. In some of them I have found where the teachers have put in pictures and other bits of beauty at their own expense; they have kept them neat and clean as they should be, and they should be painted often, and made as comfortable and beautiful as possible, a thing of delight to teachers and scholars. Where you find such teachers as that, you will generally find teachers of character and you will see the effects upon the children. I want to say another thing, and that is, that we make one of the profoundest mistakes if we excuse our children from doing some of the chores before they go to school. I believe that is one thing that helps to make men of our boys. Another thing, are you not astonished to see the misrule which prevails in many of our higher schools? Not a week passes but there is some breach of discipline. I believe this should receive our attention and that we should do all we can to give our boys and girls well strengthened intellects, but more particularly grand, moral characters.

Prof. Cary—This has been one of the most inspiring educational meetings that I have ever attended, and I am delighted that our brother over here started things as he did. If you have been thinking over these matters, you will not take him too seriously, and you will go on thinking. There has been something said about stuffing children with books. Now, I don't believe anybody in this world ever got too much of good, solid books; I don't believe that such a thing is possible as having a child learn too much, providing he assimilates what he gets and turns it over into power. The mistake occurs when some person who does not know the nature of the human mind attempts to drill it in in the form of words without substance, without thought. Then you have stuffed that mind, but so long as the child assimilates what he gets, the more book learning the better.

Adjourned till 9 o'clock next day.

# SECOND DAY.

The Institute met at 9 a. m. Meeting called to order by Mr. SCRIBNER. Invocation by Rev. Joseph Brown.

## POTATOES: VARIETIES AND SEED.

**L. E. SCOTT**, Stanley, Wis.

Mr. Scott.

Potatoes are known upon the market by a few well-defined types, rather than by the thousand and one individual varieties that are introduced from time to time.

There may be several potatoes known by as many different names, whether akin or not, but of the same habits of growth, appearance, and characteristics. This fact makes the seed potato business complicated and confusing and we are not always certain regarding the particular variety of a potato, unless we are familiar with its origin.

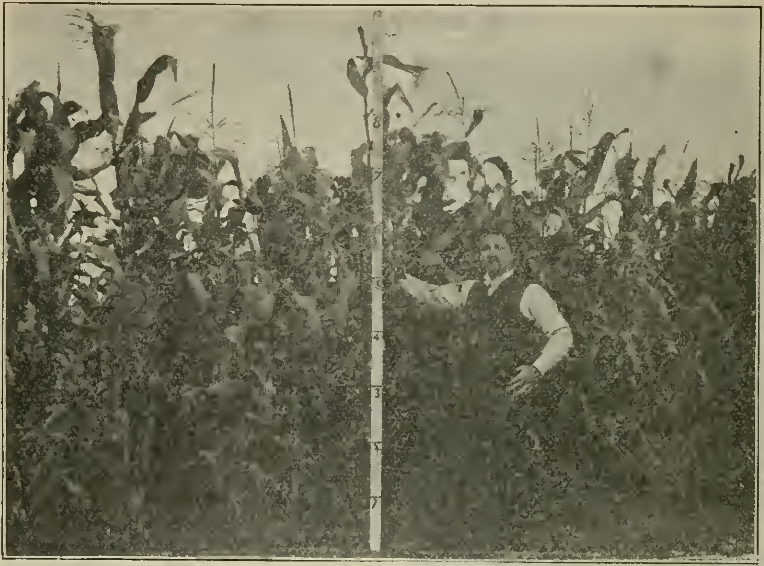
### Some Standard Varieties.

The earliest type of potato with which we are familiar is the "Triumph," known also as the "Stray Beauty." This is a round, deep red potato of poor quality and of too small a yield to be grown at a profit except in the south, where it can be grown early enough to market at high prices.

The "Early Ohio" is a round to oblong, rose colored potato, eyes large and prominent, but not deep. The "Ohio" can be easily distinguished by little pimples about the size of pin heads upon its surface and in well-grown stock there is often a crease, sometimes two of them, forming a cross, in the blow or seed end. This seems to be a sort of trademark. Of this type we have the "Early Ohio," "Ohio Junior," "Early Six Weeks Market," "Acme," and others. The "Early Michigan" is of the same type, except in color. It is a white potato, but in all other respects it is a perfect Ohio, even to the style of the vine.

The "Hebron" is an oblong potato of clouded or mottled skin, of excellent quality for fall or winter use, but not many of these potatoes are grown now. The same is true of the Rose type so common a few years ago. The decline of these last named types may be attributed, in a measure, to the changes of fashion, white potatoes seeming to be somewhat more stylish upon the market at present than the colored varieties.

Of the white varieties we still have a few of the "Burbank" type, but the great market potato for Wisconsin at this time is the "Rural." This is a round, white, smooth potato, slightly flattened and eyes flush with the surface. This potato usually grows quite even in size, not as subject to scab as some kinds, a good keeper, some seasons it is not of the best quality, but it generally sells well.



Yellow murdock dent corn planted on a tough June grass sod at Stanley, Wis., the last of May, 1902. This picture was taken Aug. 11 before all had reached its full height. The corn was much more even a few days later.

Of this type we have the "Rural New Yorker No. 2," the "Carman No. 3," which is somewhat coarser in appearance, but markets in the same car, and the "Sir Walter Raleigh." The latter more closely resembles the "Rural No. 2" in appearance of both tuber and top, not quite as good a yielder, but considered by many to possess a quality superior to either of its running mates.

Whether new varieties of the above named types will be propagated, as they must needs be from the seed ball, and these particular types be thus perpetuated is uncertain, but it is quite probable that twenty-five years hence the individual varieties that we are growing now will be a thing of the past.

### Selection of Seed.

To what extent potatoes may be improved, or held up to their full size, vigor, and yield, by selection of seed is an open question, but, at best, the advantages of such selection can be but temporary, for our favorite varieties will run out with time as they have in the past, and we shall be obliged to place our affections upon something of a newer origin. Selection of seed is advisable to the extent of casting out all sprouts, or tubers of a foreign type, at least, and while the planting of second-sized potatoes is allowable when merchantable stock is high in price, it is well to plant a few rows from selected tubers from which to save the next season's seed. This selection is best made by setting stakes opposite the most vigorous vines during the growing season and saving your seed from those hills at digging time.

### Care of the Seed.

But important as selection may be, of still more importance is the care of the seed. The growth of sprouts will quickly tax the vitality of the tuber. For a very early crop, it is advisable to start the potatoes in a warm place and plant them carefully, so as not to injure the shoot. But beyond this, do not let your seed stock sprout till planting time. To accomplish this, store dry in cool cellars, keeping the temperature as low as thirty-five degrees as long as possible.

In the spring, open the cellar at night and close it in the morning. If sprouts start, shovel from bin to bin. This will check the growth of sprouts and develop muscle as rapidly as does a game of football.

Another, and perhaps a better plan, is to take the potatoes from the cellar at this time and spread them in a single layer on the floor of some vacant building, or upon racks or trays, where they will start a short, warty, green, tough sprout, which will hardly be broken off in process of planting and may be rather a benefit than otherwise.

The soaking of seed potatoes from one and one-half to two hours in one pint of formaldehyde diluted by twenty-five gallons of water will kill the scab germ and if the soil is free from the disease a smooth product may be expected. If, however, the soil is infected with the germ, the plowing under of green clover or rye will render the soil more acid and thus reduce the amount of scab materially.

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## DISCUSSION.

Mr. Goodrich—Which is the blow end?

Mr. Scott—It is commonly called the seed end, the end farthest from the stem, which contains the largest number of eyes.

Mr. Culbertson—Is there any difference in varieties doing best on sandy or heavy soil?

Mr. Scott—I think the round varieties will do the best on heavy soil, better than the long varieties, that has been my experience. I dont know what the reason is.

A Member—The "State of Maine" is a potato that is selling quite well with us and it does well on sandy lands. It is a late potato.

Mr. Culbertson—How long would you cut them before planting?

Mr. Scott—There is no advantage in cutting any length of time before planting. It is a little pleasanter to handle the seed after the moisture is dried off.

Mr. Culbertson—Is the Carmen No. 3 as good a keeper as the Rural New Yorker?

Mr. Scott—Yes, I think it is.

Question—Do you plant with a machine?

Mr. Scott—Yes.

Mr. Culbertson—Is there any advantage in planting with a machine?

Mr. Scott—It saves time and is all right under favorable conditions. Under unfavorable conditions, if the seed is punctured or mangled, as it must needs be if planted with a machine with automatic drop, the potatoes will rot more quickly than if handled carefully by hand. With such a machine, if there are any little short sprouts, they will be broken off by the scraping and picking up of the seed, which doesn't start as quickly again, and in a period of excessive wet of course will rot more quickly than if they started right away and came up quickly.

Mr. Utter—If the bruising of the seed makes them more liable to rot, why does not the cutting of the seed?

Mr. Scott—Cut seed will rot more quickly than whole seed and the greater proportionate amount of cut surface we have exposed, the greater the liability to rot.

Question—Would it be better to cut off a little piece of the seed end?

Mr. Scott—No, don't do that. They tried a three-years experiment in Madison, and also in Ohio, to determine the relative value of the seed end and the balance of the potato. What little difference there was, was in favor of planting the seed end. There was but little difference in the yield, however.

Question—How do you cut your seed?

Mr. Scott—There have been a great many experiments tried in cutting seed potatoes, whether one, two or three eyes, quarters, halves or whole potatoes, and I have about made up my mind after careful consideration that a potato from medium to large size should be cut in about four pieces, in as chunky a form as possible. They have shown larger yields by planting halves, but when you deduct the extra amount of seed used, I think the greatest net profit has been obtained by planting a quarter of potatoes of medium to large size. Smaller potatoes should be cut in thirds or halves. A cut piece should weigh about one ounce.

Question—Do you plant just one piece in a hill?

Mr. Scott—Yes.

Question—In cutting seed, would you cut them lengthwise?

Mr. Scott—No. I would cut in as chunky a form as possible, so as to have as little surface as possible exposed.

Question—Is that regardless of eyes?

Mr. Scott—Regardless of eyes. In cutting the potatoes in four pieces, you will be very apt to have from one to three eyes on a piece.

Mr. Culbertson—Do you cut them by hand or by machine?

Mr. Scott—I have cut them both ways. I would rather cut by hand than by any machine that I know of.

Mr. Culbertson—Can you make a success of cutting them by machine?

Mr. Scott—Yes.

Question—What becomes of the surplus eyes on the seed end? If you have more plants than one in the hill will they all grow?

Mr. Scott—Let them grow.

Question—Cutting the potato then, the stem end, you would have very few eyes, and in the other you would have more than there should be in a hill?

Mr. Scott—You would have more than upon the stem end, to be sure; but experiments show that we get more potatoes also.

Question—More small potatoes?

Mr. Scott—I don't know that.

Question—If you planted the whole potato, would all the eyes grow?

Mr. Scott—No, sir, not all of them; more than one would, though.

Question—Do you think it makes any difference according to the variety of the potato about the manner of cutting?

Mr. Scott—Well, a round potato I would cut through the seed end both ways if I were cutting it into four pieces, but a long potato I would cut the other way, so as to get the pieces in as compact a form as possible, with the least cut surface. If you were to cut a long potato lengthwise, you would have a long, slim piece with a large proportion of cut surface.

Mr. Hill—Are you sure that all the eyes grow on the seed end where there are a large number of them on a small piece of potato?

Mr. Scott—No, I am not sure that they would all grow. I am sure of this, however, that we get the best and most vigorous sprouts from the seed end.

Question—Wouldn't there be apt to be quite a good many small ones if there are several sprouts?

Mr. Scott—The more seed you use, the more small potatoes you will have, but the larger will be your aggregate yield.

Question—I mean with one big stem, or two, you would have larger potatoes than with a good many small stems.

Mr. Scott—Yes, the finer you cut your seed, the larger potatoes you will have, but you will probably have a proportionately smaller yield, except under the best of conditions.

Question—Is there any danger of changing from light to heavy soil?

Mr. Scott—I don't think there is any danger in changing seed potatoes from one kind of soil to another, or from one section to another in the same latitude. Those south seem to think there is an advantage in getting northern grown seed, but in growing seed potatoes for seed men, they have sometimes furnished me with seed grown at a distance. Planted side by side with seed of the same varieties which I have grown and cared for myself, I have invariably had the best results from the latter, properly caring for the seed, than in changing from one soil to another.

Question—What varieties would you recommend for Wood county?

Mr. Scott—For market I would recommend the Rural No. 2.

Question—Is there any difference between Rural No. 2 and Carmen No. 2?

Mr. Scott—Properly speaking, there is no such potato as Carmen No. 2. The late Mr. E. S. Carmen, for many years editor of "The Rural New Yorker," put out four potatoes, Carmen No. 1, Rural No. 2, Carmen No. 3, and Sir Walter Raleigh, which are all of the same type. Carmen No. 3 is a little coarser potato than the Rural No. 2 and has a little different style of top. Sir Walter Raleigh has the same character of top as the Rural No. 2. You can't tell them apart. In fact, I would dislike to be obliged to pick out the Sir Walter Raleigh from the Rural No. 2 if they were all mixed up in the same car.

Question—Can you get as much in the market for them as you can for the Burbanks?

Mr. Scott—Yes, fully, and you get a better yield on such soils as you have in Wood county, and a smaller percentage of small potatoes.

Question—Would you say the same for the lighter soil in the southern part?

Mr. Scott—Yes. The lighter soils of Wood county I think are no lighter than those of Waupaca and Portage counties and the Rural has superseded the Burbank in those counties.

Capt. Arnold—Do you mean to say you get a larger yield where you cut your seed fine?

Mr. Scott—No, I didn't say so; I say you get a larger potato, but not as many bushels. The difference would be but slight, however, if the conditions are favorable, but if the conditions are not favorable, for instance, if your land is not in perfect tilth and it is very dry, you will be liable to get a poor stand from potatoes cut to one eye in the piece, or if it is very wet, there would be a risk of a poor stand.

Question—Then you would regulate your cutting by the conditions?

Mr. Scott—We don't know what the conditions are going to be.

Question—Why, you cut the same day you plant, don't you?

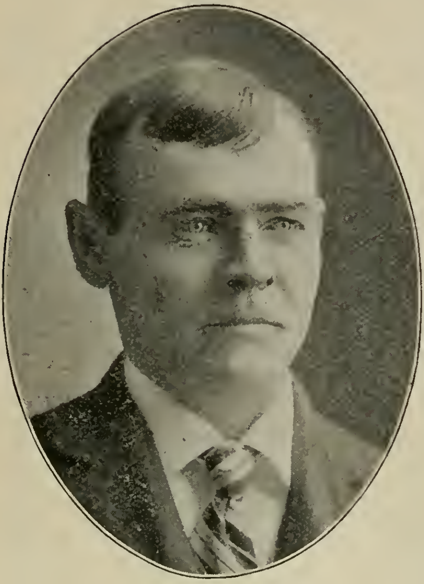
Mr. Scott—We don't know what the weather is going to be through the season. It is unsafe to advise the average farmer to cut potatoes as fine as one eye in a piece, and, in fact, hundreds of experiments prove conclusively that the greatest profit, take it one year with another, comes from cutting the potato into about four pieces.

Question—Wouldn't it be a little the best to have a big piece with one or two eyes rather than many eyes in a small piece?

Mr. Scott—I think so.

# POTATOES: PLANTING AND GROWING.

H. M. CULBERTSON, Medina, Wis.



Mr. Culbertson.

We use plants in various forms for food; so do animals and so do plants. So we feed plants in various forms to animals and when they have extracted that which their bodies are able, the refuse in its different forms again furnishes material for future plant food, which heat, moisture and air decompose, liberating from the old plant and soil grains certain compounds and mineral matter to remain in solution in the soil moisture which adheres to and surrounds the outer portion of the minute soil particles and in the humus.

Experiments and soil tests have shown that fall and early spring plowed land furnishes more soil moisture to the plant than late spring plowing and the spring plowing must be harrowed as soon as plowed to pulverize immediately and prevent lumps forming, as there will be if allowed to remain long as the plow leaves it; that soils in the finest and most mellow yet compact condition hold most moisture, and open, lumpy soils contain the least, as they permit too much circulation of air carrying away the moisture, and in the open condition the moisture cannot rise from below to fill the places of that lost, but, most of all, in open soil the plants' roots are not closely surrounded with the fine particles and humus to get nourishment from, therefore, perhaps wither and die; that potatoes require large quantities of moisture and that thorough fining of the surface by cultivation checks evaporation and furnishes best condition.

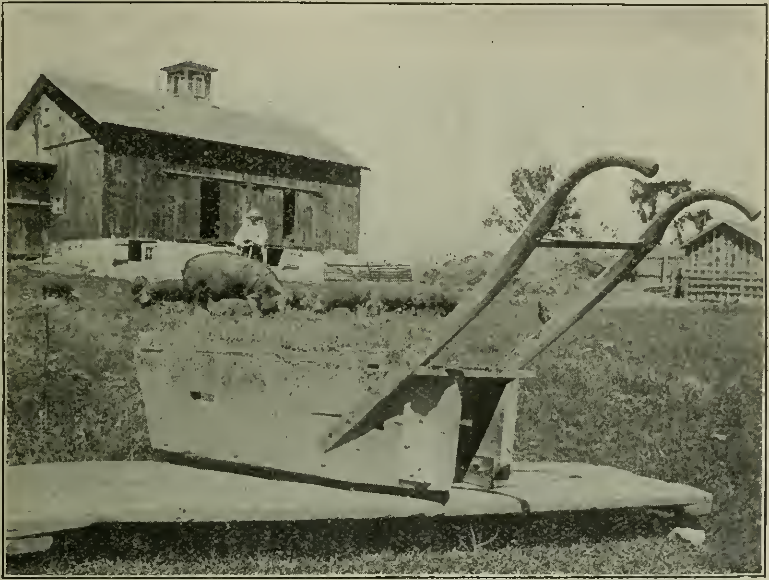
Humus, which is partially decayed vegetation and an element of great importance in plant growth, keeps the soil mellow and, like a sponge, holds soil moisture, which contains in solution the compounds of plant food taken by the plants' roots and carried to the stem and leaves, the leaves evaporating into the air the surplus moisture, so as to continue the upward moisture current and retain in the plant the food required.

Carbonic acid, a gas in the air, is taken into the plant through its leaves and combines with the other solutions, there perfecting its sap to perpetuate growth.

The soil is a storehouse of plant food, humus and moisture and as we control the application of refuse matter which furnishes plant food and humus, and cultivation, which regulates soil moisture and admits air to progress decomposition, putting the food into the proper form for the plant, we work with nature when it applies the water and warmth to the land that we may realize the best possible results from plant growth.

### Preparation of Land for Potato Growing.

On some soils, sandy soil more especially, plowing under fall sown rye just before heading in the spring has been found very beneficial for potato growing. We use sod land for potatoes because sod furnishes some plant food and humus, which ensures an open soil to admit water in time of rain and hold plant food in solution, giving it to the plants' roots as desired, and keep the soil mellow, yet compact, that the plants' roots may be able to push on between the soil particles to extract its desired compounds. Plow in the fall for soil moisture, manure on the surface in winter to furnish plant food and humus and regulate surface evaporation; harrow early in spring to mellow and make a surface soil mulch and encourage germination of weed seed. The harrowing is repeated as necessary and the final preparation is with the disk harrow twice over-lapping half width, followed by thorough application of the smoothing harrow.



Home-made tool used for covering hand-dropped potatoes, also for hilling and covering small weeds.

### Planting the Seed.

Potatoes planted soonest after being cut are most sure of good results and those put into moist, cool soil and covered immediately are surer to grow and be thrifty than those dropped into a dry, hot soil and the longer exposed to open air, the less sure of good results, therefore we prefer the horse planter, which does the work quickly, plants at an equal depth, straight rows and best soil conditions, but any system which plants the seed into moist, cool soil and covers immediately is satisfactory.

In an open, sandy soil plant four to

five inches deep and in medium soils three to four, deep enough so but little hilling is required, as extensive hilling has no advantageous features, providing the planting is deep enough to ensure thorough covering for the growing potatoes, and potatoes grown well protected from the heat have been found to contain the greatest percentage of starch.

which time most of them will be destroyed.

Always keep the space between the rows thoroughly pulverized as long as the tops can be passed without tearing away, giving no attention to blossoming period.

Drills three feet apart and one eye twelve to fifteen, or two eyes cuttings fifteen to eighteen inches apart in the row, or in hills proportionally, will secure good yields, other things considered, and no tests have proven one method superior to the other.

Farm buildings of H. M. Culbertson.

### Cultivation.

Harrow with a common drag or weeder whenever the surface becomes crusted by rain, or weed seeds have germinated, to control moisture and kill weeds. If a heavy rain compacts the soil before the plants are up, cultivate very deeply and thoroughly, but in no case destroy the plants' roots; this will require what hilling is done to be done very gradually, or very early. The weeder can be used across the rows, if planted in drills, often enough to keep the weeds in check until the plants are six to eight inches high, by

### When to Plant Early and Late Varieties.

Plant early varieties as soon as the soil is dry enough to work in spring, on land so handled the previous year that abundance of plant food may be had to encourage rapid growth early in the season, or the crop may be caught by blight before fully grown. The more vigorous, later growing varieties may be planted later, as they survive more unfavorable conditions, be sure, however, and plant early enough so the crop may mature before frost kills it or the quality of the potatoes will be likely to be poor.

### How to Destroy Potato Bugs.

The purpose of the leaves has been explained, therefore we understand that if the bugs destroy the leaves the perfecting of the sap stops and growth is checked for a time, if the plant is not killed, as it will be if a large part of the leaf surface is destroyed.

To destroy bugs, many prefer to use one pound of Paris green thoroughly mixed in two hundred pounds land plaster for the first application. We have only used a tablespoon level full of green in twelve quarts of water, applying it with the hand sprinkler, knapsack automatic sprayer and horse sprayer. There perhaps may be more danger of this destroying the foliage than with plaster, but it has been suggested that one pound of fresh, common lime used with every pound of Paris green in water will counteract the injury the Paris green might do on the plants.

The New York Station says to test the purity of Paris green put a small quantity in a little ammonia, or commonly called hartshorn, and pure Paris green will all dissolve.

Family strawberry patch, 3½ months after planting, on the farm of H. M. Culbertson.

### Treatment for Scab and Blight.

For potato scab, wash the dirty potatoes and before cutting soak them one and one-half hours in a solution of one pound of formaldehyde in thirty gallons of water. Potatoes thus treated must not be used for food.

For potato blight, or drying up of the leaves, use one pound common, fresh lime dissolved in water and one and one-half pounds of blue vitrol dissolved in another vessel, either in cold or warm water, strain the lime solution. Put the two together and add water enough to make twelve gallons. This must be applied in June when the plants become about a foot high and being a preventive, not a cure, must be applied with a sprinkler every two weeks. The usual amount of Paris green may be added to each pailful of the preparation to destroy the bugs at the same time. This will prolong the life of the plant, which means a longer growing season, more vigorous and healthy plants, and usually a larger yield.

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### DISCUSSION.

Question—Can't you split the difference on the amount of the formaldehyde

Mr. Culbertson—That is the amount given by the Experiment Station.

Question—Would you use the same amount of Paris green, whether it was new or old?

Mr. Culbertson—Yes. We do not buy all brands: there are certain brands we have used three years old, and still perfect.

A Member—I think it is a fact that it is a great deal stronger after it gets one or two years old.

Mr. Thompson—In his paper the gentleman said that the way to test purity of Paris green is to dissolve it in ammonia. I have given a good deal of study to the purity of certain substances, Paris green among them, and because Paris green will dissolve in ammonia is no evidence that you are buying pure Paris green. My opinion is, that in a state like Wisconsin, with so many laws for the regulation of chemical substances sold on the market, it is strange if there is no law to regulate a material like Paris green. The only guarantee for buying Paris green is to buy it on its standard percentage of arsenic. If Paris green is what it should be and it is properly kept, at ten years old it is just as strong as at one year old.

Mr. Stiles—Do you plant your early and late potatoes at the same time?

Mr. Culbertson—No, we plant the early potatoes as soon as the land is fit, the late varieties a little later.

Mr. Scott—I doubt the statement made by this gentleman that Paris green increases in strength with age. Again, as to the test to show its purity, while the ammonia will not prove its purity, yet a very common substance with which it is adulterated is a substance called barathese, which will not dissolve in ammonia and the ammonia then is a sure test of the presence of that substance.

Question—Which do you recommend, fall or spring plowing?

Mr. Culbertson—We have practiced the fall plowing for soil moisture for many years.

Question—Which would you consider the best way of planting potatoes in this section of the country, shallow or deep?

Mr. Culbertson—That would be something you people could determine better than I could recommend. I should think three inches would be deep enough in most soils here.

A Member—In the south-eastern part of the state, we use a shallow plow a great deal to make the drill, but over here they laughed at me, they said I would not get any potatoes, that they planted on top of the ground on account of the condition of the soil, it was too wet.

Mr. Culbertson—Some of the soils here hold water. On such land shallow planting and hill accordingly is surer of good results.

Capt. Arnold—I wish this chemist would tell us farmers if there is any practical way of testing Paris green for the ordinary farmer.

Mr. Thompson—There is no test. It should be put into the hands of a chemist to test its purity. In some countries there are laws which designate that it must contain certain percentages of certain ingredients. Without those laws, you are liable to have an adulterated substance.

Question—How about the Triumph? Won't you get a better crop by planting very late?

Mr. Scott—You don't want to plant the Triumph at all. If you do, you would have to plant late in northern Wisconsin.

Mr. Bradley—I think the best time to plant it would be just before it froze up. What is your experience as to the best kind of planter?

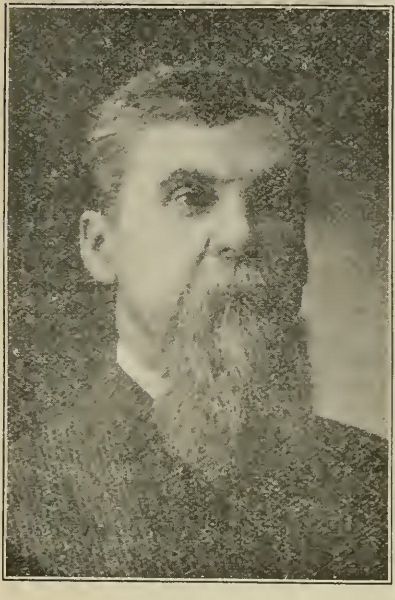
Mr. Culbertson—I have used two different styles of potato planters, the Aspinwall, and one in which the potatoes are placed by hand in an opening in a slowly turning wheel. With this there are no misses, therefore the best results.

Mr. Scott—Just a word about this cutting the seed. One experiment will hardly prove the value of a method over another in the potato business, for conditions vary so much. Take, for instance, potatoes cut to one-eye cuttings, and whole potatoes, standing side by side. Now, we know that whole potatoes will mature a crop quicker than from the cut seed, especially where they are cut fine, the finer you cut the seed the later your crop will be. Now, we have two rows, one is planted from one-eye cuttings, the other from whole tubers. At the time when the whole tubers are ripening, we have a dry spell and the vines die down prematurely. The others perhaps are affected more or less by the drought, and yet they are not entirely caught. There comes a rain which thoroughly soaks the soil, one row is through with its growth entirely, the other rows revive, will grow for two, three or four weeks and will produce a very satisfactory crop. Now, the average farmer will just jump at the conclusion that the one-eye cutting is a good thing for him when it just happens that there is a little difference in the conditions which might just as well have been in favor of the other. So, one experiment will not prove anything.

A Member—To come back to this Paris green question. I would like to know if there is no experiment on old and new Paris green. Down our way any one will pay three or four or five cents more for old Paris green.

# POTATOES: HARVESTING AND MARKETING.

DELBERT UTTER, Caldwell, Wis.



Mr. Utter.

While the difference between the method of harvesting the potato crop by the use of the spading fork or with the latest improved machines is as great as the difference between the old reaper and the new harvester, yet I venture to say that nine-tenths of the crop is harvested by the old method. This is not because it is the best method, but because conditions are not favorable to the use of the new tools. The bulk of the crop is grown by small growers who cannot afford the outlay for high-priced machines, and many fields are too rough and stony for their use.

Where a farmer makes a specialty of potatoes and grows a large acreage for market, it would be best for him to use one of the modern diggers requiring four horses. Sufficient help ought to be had for picking and bagging, so as to keep up with the machine. With the use of these tools, a man is often able to dig and rush potatoes to a city market and take advantage of high prices. When the haul is short, low, wide-tired trucks can be used to good advantage, as larger loads can be drawn and with less labor in loading.

### Harvesting the Early Crop.

My method of harvesting the early crop, which is begun as soon as the tubers are of marketable size, is by the use of the spading fork, throwing two rows together and keeping three rows ahead of the pickers. We have sacks distributed along the middle one of the three rows, so as to avoid as much unnecessary carrying as possible. Close attention to details counts for as much in the potato field as anywhere. Much time is lost waiting for Johnny to bring a bag.

We pick up the potatoes as soon as dug, for if put in sacks after lying in the sun any length of time they will be liable to rot during shipment. The work is rushed and crop marketed as soon as possible, hauling to market by team and selling to grocers, hotels, restaurants, so as to take advantage of existing high prices. Hundreds of growers near every large city follow this method and find it profitable.

### The Late Crop.

The late crop is marketed in the same way where there is a nearby market, at this time selling directly to families, as well as to grocers. The prices obtained are often ten cents a bushel above car lot prices on track.

The late crop should be harvested as soon as well matured, as there is usually danger of loss by freezing after the middle of October. Unless the grower has had experience in shipping and selling his crops, he will probably do best to sell to local dealers. The grower who has the ability and experience to successfully sell his crop will probably soon be a dealer and not a grower. Consignments are not generally satisfactory, not because the commission man is not as honest as the rest of mankind, but for the reason that he is a buyer of potatoes and has his own stock to sell first. Then he has several large shippers whose business is worth looking after, so the farmer's potatoes are liable to be sold last and probably to some merchant whose trade is worth giving him a bargain at the expense of the farmer.

Home of Delbert Utter.

### DISCUSSION.

Question—Do you think it best to keep potatoes till spring or sell in the fall?

Mr. Utter—If we keep informed in regard to the crop prospects as other growers are, we shall be able to judge as to the probable prospects, but it is a very uncertain speculation at best. In localities where there are large acreages of potatoes, part of the crop must be kept over, as shipping facilities are not great enough to handle them in the fall.

Supt. McKerrow—About what is the percentage of loss in weight from the loss of moisture and loss of the few potatoes that will get bad?

Mr. Utter—I have no way of determining the difference, but I should judge fifteen per cent. from the time they are dug until the next spring.

Mr. Scott—In the late spring, it would be very much more than that, we will say from this on till the middle of May there would be a tremendous loss.

Supt. McKerrow—This time, and a little preceding this, is when we get rid of the bulk of potatoes held over, I believe.

Question—Does it change the quality of the potato, whether you dig it early in the fall or late?

Mr. Utter—I think the later a late potato can be dug without any danger of frost, the better will be the quality.

Mr. Scott—Isn't that true of any potato, providing it is well covered?

Mr. Utter—Well, I think not. I think a potato that ripens in hot weather deteriorates by lying in the ground after being grown.

Jerseys and Ponies on Farm of Delbert Utter.

Question—Won't it start to grow a second time in the ground?

Mr. Utter—Seldom.

Mr. Bradley—Won't it deteriorate more if you dig it than in the ground?

Mr. Utter—Not if placed in a cool cellar.

Mr. Scott—I take issue with Mr. Utter on that. I prefer to leave it in the ground if it is well covered.

Mr. Utter—But the early crop is not grown for keeping purposes; it is supposed to be consumed at once.

Question—What is the cause of the growth of knobs on potatoes, making them unsalable?

Mr. Utter—I do not know.

Question—Do you ever use crates in picking up potatoes and hauling them?

Mr. Utter—I never have to any extent. I think bags or sacks are more convenient.

A Member—We have used crates a good deal and find them very satisfactory. We follow up the digger and they will dry out and are hauled away.

Mr. Scott—I usually prefer the crates. I think this question over here about the knobs on the potatoes ought to be answered. Before the potato is fully matured, sometimes if there comes a dry spell and the growth is checked, there is a second growth of the sprouts, and they will produce what we call knobs or prongs. The more deeply you can plant your potatoes, the smoother will be the product. Another cause of this trouble is from hard soil, not properly tilled. Have your soil mellow and you will have a smoother product. I would like to ask this gentleman, are there some varieties more liable to be knobby than others?

Mr. Utter—I think it is the season more than the varieties. Last season, on account of the wet weather, our early crops were very knobby and were hollow at the same time.

Mr. Vaughn—With respect to the knobbiness, I think you will find that the long potatoes are more apt to be knobby and rough.

# RAISING THE BEST HEN.

**Mrs. ADDA F. HOWIE, Elm Grove, Wis.**

To successfully raise the best and most profitable fowl, the farmer must plan and follow out a systematic course in breeding and rearing his flock, and, as a considerable revenue on the average farm may be derived from the poultry yard, it is somewhat strange that more studied attention is not usually given to this branch of farm industry.

Poultry House, Sunny Peak Farm.

### Some Advantages of a Single Breed.

A well-bred flock of poultry, uniform in type and coloring, never fails to attract the attention and leave a pleasing impression on even an uninterested visitor, while the stranger who passes by a farmyard where such a sight is to be seen will almost invariably pause to admire and, from the evenly developed birds of a single strain, quickly draw favorable conclusions as to the character and progressive nature of the occupants of the farmhouse. Consequently the farmer whose good judgment and ambition prompt the keeping of but one breed will have a decided advantage over the professional breeder whose plant is restricted to a few acres and whose flock generally consists of a variety of kinds that necessarily must compel a prolonged, close confinement to yards that are not infrequently overcrowded and are filthy and unwholesome from long and constant use.

As the unlimited farm range may be safely offered to the single breed, with the exception of a few weeks during the period when the eggs are reserved for incubation, the advantage is quite apparent, for the freedom of the range will greatly add to the healthy condition and sturdy nature of the birds that are raised and thrive under the stimulating influence of practically unrestricted ground for feeding and exercise. A twofold profit may be gained by keeping pure bred fowls of a recognized strain that have received intelligent thought and care in the selection and mating of foundation stock.

### Selection of Eggs for Breeding Purposes.

One should never breed from the entire flock, but, rather, select the choicest specimens, which must be carefully separated from the more or less defective birds, and from these and these alone should the eggs for hatching be obtained.

In order to secure best results, all eggs for incubation must be selected from well developed, mature hens of medium size and as near perfect conformation as possible. To obtain the finest specimens of any breed, new blood should be introduced each year. One year the flock may be benefitted by the addition of a choice, young male, carefully selected from the best strain, while the next season marked improvement will be assured by securing non-related pullets, from equally well-bred stock. And while it would not be just to judge the working qualities of a hen from the standard of markings, or colorings set forth on the score card, a bird that is faulty in these respects should be unhesitatingly banished from the breeding pens of those who are desirous of improving the quality and reputation of their stock.

### The Barred Plymouth Rock a Popular Fowl.

In order to be successful from the start, one should have a definite purpose in view, and should the aim be to secure a bird best suited to the commercial demand for early broilers or equally satisfactory for all table needs, with due respect to many other admirable Asiatic and American breeds, in my opinion, there is no more popular or worthy fowl than the good-natured, easily-raised, and readily-controlled Barred Plymouth Rock.

It is hardy and well adapted to our climate, the flesh is of excellent quality, and, where desired for early marketing, its rapid development is of so valuable consideration as to place it in the foremost rank. For both table use or egg-production, this breed should be hatched early in the season —February or March is not too soon for the chicks to arrive. Comfortable brooder houses with well ventilated brooders, kept scrupulously clean and the floor covering frequently renewed with fresh, dry earth, must be provided, while a constant supply of pure water, systematic feeding and care are also necessary for the health and proper development of these early hatched chicks, always allowing as wide a range as weather conditions will permit. Under no circumstances should more than fifty chicks be confined to one brooder and a frequent sorting of the stronger and weaker birds will have a beneficial effect on the entire brood.

### Merits of the Buff Leghorn.

However, should one prefer to secure a goodly number of eggs and at a season when the scarcity of supply will insure gratifying returns, I am convinced, after an experience with a number of egg-producing varieties, including the White, Brown, Rose and Single comb Leghorns, housed, fed and cared for in a similar manner, that the Buff Leghorn will come nearer to meeting a reasonable standard of requirements than any of the other breeds. We are indebted to England for this sturdy, active race of prolific layers, and, while, as yet, this strain has not become so thoroughly established as to invariably reproduce uniform coloring in plumage, it merits as an egg-producer are readily recognized wherever it has been introduced.

In size it is somewhat larger than either the Brown or White Leghorn; a strong, thrifty bird of excellent form and pleasing appearance, with the commendable habit of laying an unusually large, white egg, that is greatly esteemed by the exacting buyer.

If due care is exercised in selection and mating, one may soon secure a flock of superior fowls that for egg-production cannot be excelled. Unlike the more domestically inclined Plymouth Rock, this breed is prone to shirk the responsibilities of motherhood, she is unreliable as a setter, and her delincuencies as a mother can only be offset by her persistent ability and good will to produce eggs at all seasons of the year. It is no unusual thing for pullets of this breed to begin laying at an age of between four and five months. I have known an incubator bird, hatched early in April, after producing a goodly number of eggs, to strut proudly from a hidden nest with a shivering brood of chicks she had brought out on the first day of the following November.

Where eggs are to furnish the principal basis of an income, too early hatching of these quickly maturing birds is detrimental to the best interests of the business, as pullets hatched during the winter and early spring months will begin laying in the heated period of summer, but will also moult later in the season, which will greatly interfere with the winter's egg supply. Birds hatched the latter part of April, May, or even in the early days of June, will make far more profitable producers, while the saving in labor necessary for the care of the chicks hatched at a time when weather conditions are most favorable for rapid growth and when they may at once be given ample range on the sun-warmed earth is of no small consequence when summing up net profits.

A year old hen is in best possible form to provide eggs for either incubation or market and after the age of two years they rapidly deteriorate and should be carefully culled from every first-class flock.

While breed, object and wise selection are important factors in successful poultry culture, not less essential are the quite as weighty considerations of clean, comfortable housing, regular feeding, and intelligent care and management in raising the best hen.

## DISCUSSION.

Question—What kind of a brooder do you use?

Mrs. Howie—The one we prefer is a cheap brooder, called the "Olentangy." It is manufactured in Cardington, Ohio, by Geo. E. Singer, the cost is $5 and it is supposed to hold one hundred chicks, but will better accommodate thirty-five.

Question—Do you prefer to save eggs from pullets or older hens?

Mrs. Howie—Always save the eggs from the mature hens if you wish to improve your breed. The eggs from mature hens are also very much larger, consequently more acceptable to the average buyer.

Question—What breed do you recommend?

Mrs. Howie—Of course there are many breeds. We have in the Mediterranean class the Minorka, the Buff, the White, and Brown, all of the Leghorns. I prefer the Buff Leghorn; it is a little larger than either the White or Brown, and I think a somewhat better layer.

Question—Have you had any experience with Houdans?

Mrs. Howie—Not of late years. Some years ago I had one or two of that breed in the flock and I esteemed them very highly. I think perhaps they are a little more tender than the Leghorns, but they were fine layers.

A Member—Very much superior to the Leghorns as a table fowl, I think.

Mr. Matteson—They are objectionable in the market because there is less white skin. I think the young chickens are more tender.

Question—Do you find any difference in the market with eggs as to whether they are large or small?

Mrs. Howie—I find that people who buy them greatly appreciate the large eggs. I have one customer who takes five dozens every week. We have one hen that always lays a double-yolked egg and we always put one double-yolked at the top of this customer's basket. He sent me word if I would furnish him eggs of that size he would give me sixty-five cents a dozen the year round. Unfortunately I have only one hen that lays that kind of an egg.

Question—Do you count that egg as one or two?

Mrs. Howie—I count it one and always throw it in, because it is for a very good customer.

Question—What is your remedy for lice?

Mrs. Howie—We go to the pens after the fowls have settled on the roosts at night, take the hen by the feet and hold her head down, and then with one of those Persian insect powder puffs, puff the insect powder well into the feathers. If you hold her in that way, the feathers will all fall back and the powder will reach the skin. Then when you right her, she will shake herself and the powder will be well distributed throughout the feathers. Two applications a year will keep birds comparatively free from insects.

A Member—How is burning sulphur as a remedy?

Mrs. Howie—I have never tried it. I think it might be well to fumigate the house when the birds are out, but I would not like to attempt to do it when the birds were present.

Mr. Matteson—There is danger of your fowls catching cold, I think.

A Member—One of my neighbors did it.

Mrs. Howie—He probably would not care to tell the results.

Question—Couldn't you use this powder in the dust bath?

Mrs. Howie—Yes, you might, but I don't think you would be so sure of the best results as if you took each bird separately and puffed the powder thoroughly through the feathers, head and all. I have heard that here was a machine into which you might put ten or twelve hens with some powder and whirl them around, but I should be a little fearful of subjecting laying hens to such rough usage.

A Member—This machine must be a sort of hen merry-go-round.

Mrs. Howie—I don't know how "merry" the hens would be.

Question—Is the Plymouth Rock hen supposed to be a good layer?

Mrs. Howie—Many think so. To me she is objectionable because of her persistent desire to set, and I am afraid of setting hens.

Question—Which do you consider the most profitable, making a specialty of broilers, or eggs?

Mrs. Howie—Well, I have never made a specialty of broilers, because it requires a good deal of time. They are hatched at a season when they need much care, and the egg production has been very satisfactory to us; therefore I have preferred that branch.

Question—Do you sell to private parties?

Mrs. Howie—Yes. I also supply one drug store where these eggs are used for fancy drinks and invalids. During the hatching season we also dispose of a great many eggs for the purpose of hatching and we find a large part of our revenue is derived from this source, because eggs at $2.00 a setting will soon figure up in the profits of this business, and that is a good reason why each farmer should keep but one breed, and build that one breed up to its very highest limit. It can easily be done, and a very good revenue obtained in that way; much better than where a number of kinds are kept and where the breeds are liable to become mixed.

Question—Is not the Plymouth Rock hen a better brooder than any manufactured one?

Mrs. Howie—I can't say as to that. We have been very successful hatching chicks in the incubator and brooding artificially. In fact, I think we have done better with our brooders than with hens that were prone to wander about dragging the young chicks through the wet grass.

Question—I have noticed that a great many brooder chickens commence to cripple when they are three or four weeks old.

Mrs. Howie—That is because we do not give them sufficient range. As soon as a chick can hop over a wire fence a foot high, it should be given plenty of range. They will soon come back to the brooder. Another thing, we feed on the same place too long. If we are not careful to change often, the ground becomes foul and they will soon begin to droop.

Question—Do you put any grit in the food for the little chicks?

Mrs. Howie—Certainly. The next speaker will tell you about that.

Question—Isn't it possible to select a laying hen the same as you would a dairy cow?

Mrs. Howie—Well, yes, you will form an idea, of course, as to the form and shape that you would like your hens and after a little time you fall into the same habit as the dairyman, of selecting some accepted type.

Mr. Goodrich—Wouldn't you breed them up in the same way that a person would improve his dairy cows; set the eggs from the hen that will lay the most and the biggest eggs? Mr. Van Dresser, of New York, has five thousand chickens, all of one breed, and he averages one hundred and eighty eggs per hen for the year, and he claims that he has fed and bred them up in this way by selecting the best among them with reference to laying and the hen that laid the most eggs was the best hen, whether she had the right marking, or whether one part of her comb lopped a little one side, or whether one feather was twisted.

Mr. Matteson—That is a good point. As far as my experience goes, the Barred Plymouth Rocks deserve more credit than they really get. They are somewhat sluggish, but when this weakness is understood, they are really splendid layers.

Mrs. Howie—I have vainly tried for two years to secure some chicks from the hen in habit of laying double-yolked eggs, but so far I have utterly failed. However, one can scarcely give conscientious thought to the betterment of his flock without considering production of paramount value; still, every established breed should be accorded the right of exclusiveness by a rigid adherence to a standard of color and markings; and it is quite possible to secure both beauty and utility in the same fowl.

# FEEDING THE HENS.

J. L. HERBST, Sparta, Wis.

I do not intend giving you, in the short time allotted to me, any very great and new ideas on the subject of feeding the hens.

In the first place, I can give you no scientific methods, because I do not practice them. In the second place, the term "Feeding the Hens" is too broad to try and cover in a short space of time. We have too much to learn on this subject, as well as on the feeding of other farm animals.

A Good White Indian.

### Good Judgment Must be Used.

In feeding the hen, we must use our best judgment to a certain extent. If we are to feed for the egg production, we must give those foods necessary to make those elements which go to make up the egg as well as those that will keep up the hen in the best condition for that purpose.

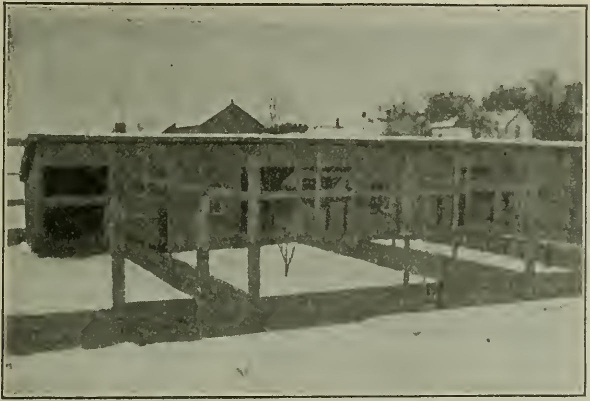
The dairyman does not feed foods for fattening stock to get good results, neither does the man who is raising beef for market feed those feeds necessary for the production of milk. You cannot expect to get good results from a dairy cow if you feed only corn and water.

It is a well-known fact that hens produce more eggs during the spring and summer months than during the cold winter months, from the fact that during this time of egg production they secure those foods necessary to stimulate the egg-producing qualities.

In feeding my hens, my object has been to make their winter life as near to the life they lead in the spring and summer months as I possibly can. The busy hen in a flock is invariably the best layer. The one that is always moving about, scratching and picking for something to eat, is invariably the egg-producing hen. And so I say, make the winter conditions of your hens as nearly like the life they lead in the summer as you possibly can.

Taking the state over, probably not more than ten in every one hundred farmers give the care and attention to the poultry to place them on a paying basis. Or, in other words, do those who are raising poultry know whether they are making enough to pay them for the feed and time expended in caring for them?

The farmer who is caring for the dairy cow to get a profit from her, sees that she is well taken care of. She is given warm and comfortable winter quarters; she is fed regularly those foods that have milk-producing qualities in them and given in the right proportions. Neglect her and she ceases to be profitable. Neglect the poultry and they cease to be profitable.



Scratching Shed Hen House.

### Regular Care and Feeding Necessary to Successful Poultry Raising.

The poultry to be on a paying basis must be given care and attention and fed regularly those foods which contain the properties necessary for their welfare. During the summer months, when they have free range, but little work will be required. They secure the various foods necessary for the production of eggs. and there is no trouble in securing fresh eggs and plenty of them each day; but as a rule the market at this time of the year is filled and eggs are cheap. I do not care how many eggs my hens produce at this time and should prefer them to lie idle, but on the approach of winter I want them housed and fed properly, and when eggs are scarce I want them. There is some satisfaction in getting twenty to twenty-five cents and even thirty cents a dozen for them, but as a rule they are worth about ten cents in the summer months.

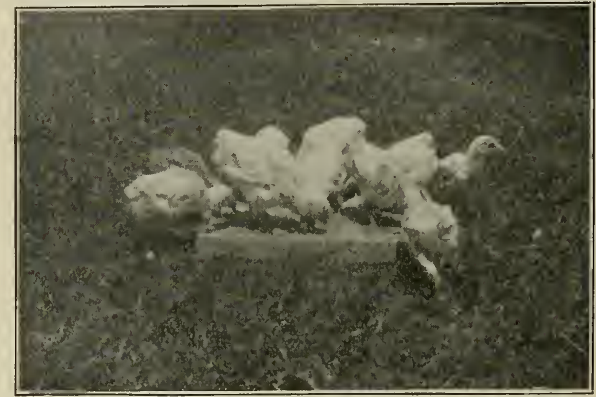
### Care of Fowls During Winter Months.

On the approach of winter, your poultry should be properly housed in warm quarters, with plenty of pure air, a variety of food, with plenty of grit and exercise. Do not delay in this, as the birds are liable to catch cold on the approach of winter weather, by the cold winds and rains, and this is very likely to develop into canker throat or roup and they will suffer with this all winter if not attended to at once.

The morning food of my flock consists of equal parts of bran, corn and oats made into a mash by the use of warm water. To this is added occasionally a little poultry food mixture.

I give just enough of this to create a good appetite. About twice a week I mix in this mash some boiled potatoes, carrots and mangel wurtzels and a little onion to flavor. Immediately after this mash they are given a mixture of grain, such as wheat, oats, barley and the like, which is thrown in amongst straw or any coarse litter, in which they are made to work for it. Their evening meal consists of corn and occasionally buckwheat. As these have heating qualities in them, I consider this the best time to feed these last two mentioned. My birds have before them plenty of fresh water, grit and oyster shell. Probably one of the most valuable foods in grains for the laying hens is oats, but they must be fed carefully. Plenty of grit must be given with this food, or better scald them the night before and give them in the soaked condition, but drain them off before doing so. Cabbage hung up for them to pick at will furnish them with green food, or if this is not to be had, cut clover hay scalded will answer the same purpose.

Most all the above foods are to be found and readily had on most all farms and if properly fed will give surprising results.



Feeding Time.

## DISCUSSION.

Question—In taking care of the dairy cow, these fellows tell us we should make it easy for her. If that is so, why should we work the hen so hard?

Mr. Herbst—That is in the winter time. They must have exercise.

Mr. Goodrich—The dairy cow does her work chewing her cud.

Mr. Herbst—I don't believe the successful dairyman leaves his cows standing in the stable all day long. They get some exercise.

Question—Do you consider corn a necessary feed for the hen?

Mr. Herbst—I think they ought to have corn to some extent, or other food that will answer the same purpose.

Mr. Matteson—At this season of the year, you would probably feed less than along in the winter.

Mr. Herbst—I am only feeding corn twice a week now, whereas in the winter months I feed every day.

Mr. Matteson—You will also find, I think, that the smaller breeds will stand more corn than the larger breeds.

Mr. Herbst—You have to use judgment in giving corn to all breeds. I try not to get my birds in too heavy a condition..

Mr. Scribner—I wish you would explain what you mean by getting summer conditions in the winter?

Mr. Herbst—You will notice in the summer time, when you let a hen out she runs a ways and picks up a blade of grass; then she will run along and pick up a weed seed and a piece of gravel, she is moving around all the time busy after something. My idea is to make them do this same thing in the winter time. Throw their feed amongst some litter, using part of the house as a scratching pen; give her those things in the winter time, if you possibly can, that she naturally gets in the summer time. Use cabbage and cut clover hay for green feed.

Question—What is the best kind of grit to feed them in the winter?

Mr. Herbst—I am using oyster shells, or mica grit. I keep it before them in automatic troughs.

Question—Is there any other grit just as good?

Mr. Herbst—Gravel from the gravel pit is just as good.

Question—How is sand?

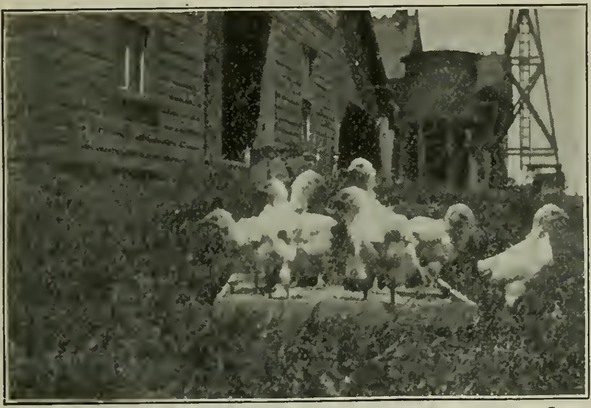
Mr. Herbst—Sand is good. It has to be pretty coarse, though.

Mr. Culbertson—Some of us have more corn to feed than anything else. Now, can we get hens to produce eggs from corn feed, and if not, why not?

Mr. Herbst—You cannot get eggs from feeding corn entirely, because corn does not contain all the elements necessary to make eggs.

Mrs. Howie—Couldn't you balance up that corn with some skim milk in your ration?

Mr. Herbst—Yes. I don't pretend to know anything about balanced rations for my hens. I know I must feed them a variety of foods though.



Satisfied.

Mrs. Howie—What value do you put on cut bone?

Mr. Herbst—I can't answer that.

Mr. Matteson—Cut bone is one of the best rations to feed poultry, but I am free to say if I was to take my choice between skim milk and cut bone, I would take the skim milk by all means, because you can treat it in so many ways, you can feed it to your young chicks, you can curd it and on that account it is more valuable than the green cut bone.

Question—How do you cut bone?

Mr. Matteson—Any of the bone machines that are on the market today will do good work. The only objection to them is the elbow grease you must put onto them. The Mann bone cutter I think is a good, durable machine, and perhaps it turns a little easier than some of the others.

Question—Isn't there danger of feeding too much skim milk to fowls?

Mr. Herbst—Certainly; there is danger in feeding too much of any one feed.

Mrs. Howie—Would you advise skim milk for very small chicks?

Mr. Herbst—I do not give my small chicks skim milk until they are about two weeks old.

Mrs. Howie—For the reason that they drabble themselves so much in it? If you will wait until they are well feathered they will do better.

Mr. Matteson—There is no reason why they should drabble through the skim milk. I have been feeding skim milk sixteen years, that is my first feed in the morning, warm skim milk. That furnishes a drink and a food. We have what we call automatic fountains; by the use of them, you put the milk in a saucer below and there is never more than half an inch on the inside of the saucer and they cannot get into it.

Mrs. Howie—Suppose we have all the different kinds of grain to feed our chickens and ground bone and grit and skim milk, is it necessary to feed the hen for egg production a feed of mash in the winter time?

Mr. Herbst—I get better results by giving them this mash the first thing in the morning. I have tried doing without it, and I believe I do better by feeding it. When they first get down from the roosts, their stomachs are empty and I think that mash starts them along nicely. I give them just enough to create an appetite.

Mrs. Howie—My experience has been similar to Mr. Herbst's. I have found it a very valuable morning food.

Question—What about oilmeal?

Mr. Herbst—It is all right if you don't feed it too often, a little of it is a good thing.

Question—What do you do with a hen that eats her own eggs and some of the other hens' eggs?

Mr. Herbst—I don't know anything better than to chop her head off, though you can break them sometimes. This habit comes from various reasons. An egg might have become broken by another hen after laying and this hen comes along and gets a taste of it, then seeing another egg she might try that one too and form the habit. Sometimes it comes from lack of food. It is largely due, probably, to the fact that the eggs have soft shells from improper feeding.

Question—How do you feed the little chicks?

Mr. Herbst—I leave them sometimes thirty-six hours before they get anything to eat; then they are given boiled egg and very often I mix it with cornmeal and sand. This is fed to them in very small quantities, but quite often. I mix them about half and half. I give them that feed in a dry condition, not soaked.

# INCUBATOR AND BROODER CHICKS.

C. E. MATTESON, Pewaukee, Wis.

As I understand the real meaning of this subject, as placed upon the program, it is to draw out, if possible, the advantages and disadvantages of the artificial practice of hatching and brooding chicks. From the sixteen years of actual practice I have had in this direction, I am fully convinced that the advantages far supersede the disadvantages and that modern poultry farming today cannot be carried on to any great extent without the ald of the incubator and brooder; nevertheless, I would not have you think that the artificial practice has no disadvantages.

Dear Gaston and his Mates. A colony of Barred Plymouth Rocks hatched in incubators and raised in brooders, and their ancestors back of them for sixteen years, on the poultry farm of C. E. Matteson.

I often have the question asked me at our Institute gatherings: "Are chicks that are hatched in an incubator as strong as those hatched by natural methods?' I always answer this with an emphatic "yes;" still I will also say I believe that fully seventy-five per cent. of the chicks hatched by machinery are weaker and have less vitality than those hatched by hens. This, of course, is somewhat of a strong statement, but I believe I am right. Allowing this to be a fact, we must exert ourselves a little to see what is the trouble.

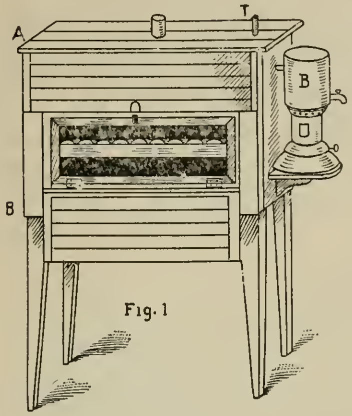


Fig. 1

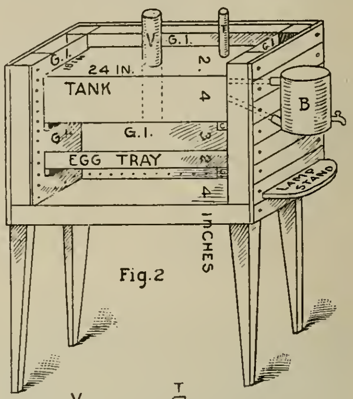

V
G.I.
24 IN.
TANK
2.
4
G.I.
G.I.
3
EGG TRAY
2
4
INCHES
B
LAMP STAND

Fig. 2

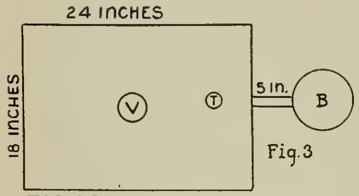

24 INCHES
18 INCHES
V
T
5 in.
B

Fig. 3

TOP OF TANK WITH BOILER

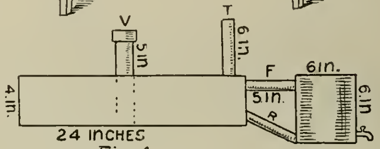

V
5 in.
T
6 in.
F
6 in.
4 in.
5 in.
R
6 in.
24 INCHES

Fig. 4

Side, or front of Tank, with boiler.
V, Ventilator, 2 inches in diameter.
T, Filling Tube and Stand Pipe, 1 in. diameter.
F. Flow. R, Return Pipes, 3-4 in. diameter.

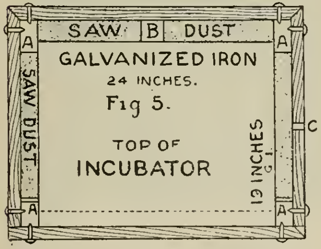
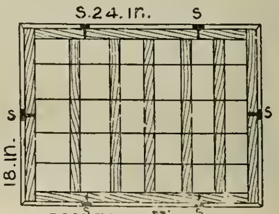

SAW B DUST
A
A
GALVANIZED IRON
24 INCHES.
SAW DUST
19 INCHES
G
C
A
A

Fig 5.

TOP OF INCUBATOR


S. 24. in.
S
S
S
18. in.
S
S

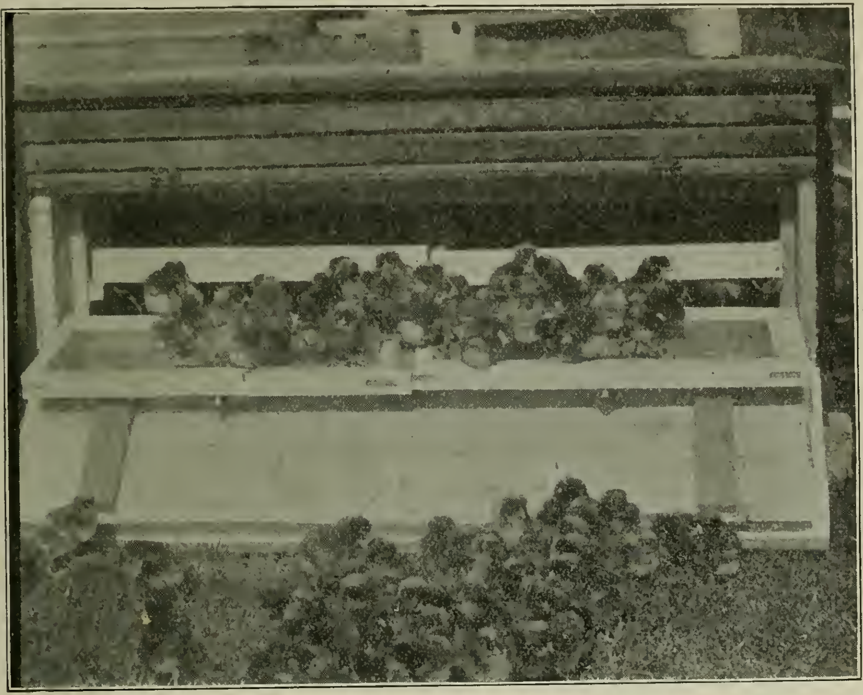
EGG TRAY Fig 6

### The Incubator.

From the most careful inspection that I have had the opportunity of giving (and that is not a little I can assure you), I find that fully fifty per cent. of that weakness in chicks is occasioned by incubators that are placed upon the market by parties having little or no experience in this practice. In a majority of cases they are not even capable of sending out lucid instructions as to just how the machine should be operated. They will probably place their whole stress upon some foolish egg-turning apparatus, or perhaps they have discovered that by the combination of several different metals in one it has great expansive powers and when used in the form of a thermostat as a regulator how splendidly it works in every respect; thus placing their whole stress upon a few strong points of their machine, thereby obscuring the weaker or undesirable parts.

Then the other twenty-five per cent. of the weak hatched is occasioned by these people who always know it all and will pay little or no attention to instructions, which is sure to result in mismanagement and weak chicks.

So I will say that unless we can have an incubator that will give us as large a percentage of good, strong chicks as old "Biddy" can, we certainly should have no use for that machine, just for this reason. If anything has happened to the machine which has resulted in a poor hatch, it has more or less lowered the vitality of those that do hatch. You see they all have to be subjected to the same treatment, be it the carelessness of the operator, or the faulty make up of the machine. I am not here to say which, but whatever it may be, it is just as sure to weaken those chicks that do get out as it is to kill those that never hatch at all. and if indulged in

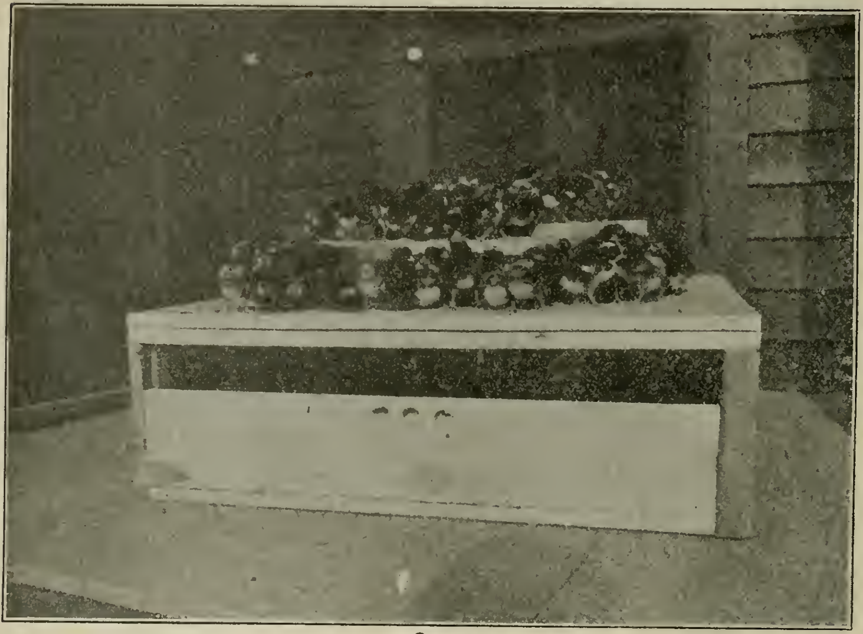


Home-made incubator; hatch just out. 72 chicks from 77 eggs. Now owned by Miss Abby M. Galloway, Whitewater, Wis., who hatched with same machine, first experience, 163 chicks from 200 eggs put into machine.

It has been said, and probably well said, that the greatest right of the child is to be well born. I think that this should be brought to bear on our chicks, by saying that they have an equal right to be well hatched, and if anything happens in any way to deprive our chicks of this right, we cannot expect them to be of the same usefulness as when properly hatched.

from year to year, saving your breeding stock from these poor hatches, it is only a matter of a short time before you can scarcely hatch a single chick.

When you have a nice hatch, do not be in a hurry to get them out of the incubator. An incubator that will not safely take care of chicks at hatching time for at least thirty-six or forty-eight hours after the hatch is all done, is not worth the room it stands in. A good incubator is the very best possible place for little chicks to harden off in, feeding nothing during that time—nature has provided for that. The last act that a chick performs before emerging from the shell is to absorb the yolk into its little abdomen. That absorption continues for at least a week and anything you may do to retard absorption is sure to result in blood poison and the death of the chick.



Home-made brooder just loaded with newly hatched chicks at the poultry yards of C. E. Matteson.

### Brooders.

Be sure that your brooders are all warmed up for the little chicks, at least a few hours before they are placed in them, place them immediately under the hover and leave them to come out at their own sweet wills. Those that do not come out at feeding time, say after three or four days, I simply pinch their heads a little. These you see are the ones that old "Biddy" usually kills in the nest, so in the machine we are not able to detect them until they are a few days old. To some this may seem cruel, but I consider it humane, for they are sure to constantly perplex the operator.

We always give the chicks the run

of the brooder floor for at least the first two days of their lives, by that time they have become accustomed to the surroundings of their new stepmother and can safely be given the run of the pen inside until they are a little stronger and can be let out doors. Now, when I say "out doors," I mean just what I say, be it winter or summer, even in our coldest weather in February or March there are but a few days when we cannot get them out doors for at least a short period during the warmer part of the day. It hardens them off and gives them good appetites.

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## DISCUSSION:

Mr. Matteson—There have not been a half dozen days this winter but what, in the warmer part of the day on the south side of the brooding house, with a little straw at the inlets, the little chicks run out for just a few minutes, and in again, and this gives them exercise, health and strength.

Question—What make of incubator do you recommend to the average farmer?

Mr. Matteson—I recommend an incubator that will give you a uniform temperature in all parts of the egg chamber and which is properly provided with ventilation and moisture, also a good regulator. Those are the four essentials of an incubator. There is no reason why anybody should be imposed upon with these cheap machines. By putting in several glasses in several different places, you can easily test the temperature. You cannot to a certainty depend on indirect regulators.

Mrs. Howie—Suppose you live at a distance from where they are sold and would like to know the name of the best machine? You have had experience and we would like to know of something that you have found reliable.

Mr. Matteson—I could not answer that question as quickly as I would have done two years ago. The machine I have been in love with has been driven out of the market by cheap machines, that was the Monarch. The hot air machines do good work on a small scale, but to say that they will do equally as good work on a large scale would be putting it too strong.

Supt. McKerrow—I understand you would recommend a hot water machine?

Mr. Matteson—By all means. There should be no difference so far as results between the large machine and the small machine with the hot water system, whereas with the hot air machine it has been demonstrated that you cannot force the hot air to the different parts of the machine to get a uniform temperature.

A Lady—How about moisture in your incubator?

Mr. Matteson—That must be governed largely by the seasons of the year, the amount of ventilation that you have to give at that particular season of the year. The warmer the weather the more ventilation you have to use, and of course this ventilation carries off the moisture. Whenever at any time you see, by using your egg tester, that you have evaporated the eggs so that your air sack occupies about one-fifth of the inside of the egg, that is the time to apply moisture; put in wet sponges or moisture pans. You have got to be guided by that. Of course, incubator manufacturers send out instructions in regard to this, but they don't know the circumstances, they don't know the season of the year you are going to run your incubator, and so really that question has to be studied out under the circumstances that you are operating your machine.

Question—Do you recommend hatching in the cellar?

Mr. Matteson—Yes, providing you have a good, dry cellar, I prefer it as a place to run the incubator.

Mrs. Howie—Perhaps Mrs. Kedzie-Jones might tell us her experience.

Mrs. Kedzie-Jones—I have had rather a peculiar experience. Running my incubator this last month, my chickens are almost three weeks old, I got a ninety-two per cent. hatch, that is, I got one hundred and seventy-seven chicks out of two hundred and three fertile eggs. I had my incubator in an upstairs room on the second story from the ground, and I used no moisture whatever.

Mrs. Howie—That is my experience. We could do nothing in the cellar, but on the second floor we had good success.

Mr. Matteson—Undoubtedly the reason why is that at this season of the year there is more moisture in the air than in the dry part of the summer. If you should attempt to run those machines in the summer months in the same room, you would not meet with the same success. Again, the probability is that when you tried the cellar it was too cold, I would just guess that, and your machine not being a thoroughly packed machine, you did not get your temperature uniform.

A Member—The house is brick veneered and I took as good a room as we had, a room we use in the warm weather for a bathroom, and we, of course, used some moisture with the heat. One of the greatest troubles I find is to get pure kerosene oil, which I think is very important, then have your lamp perfectly good and be sure to have plenty of moisture in your cups that you use around the lamp. Then I don't think you will have any trouble, but I am very much against any cellar business.

Mr. Matteson—It is not the cellar then, it is the fault of the machine.

Mrs. Howie—What is the name of the machine you use?

The Member—We have three; there are two Bantowns, and I don't know that I can name the other one, I got it second-handed, and it hatches almost the full extent of what we put into it.

Mrs. Howie—Wouldn't you advise medium sized machines rather than small ones, or very large ones holding three hundred or more eggs?

Mr. Matteson—I would, if it is hot air; but if a person has work for a large machine there is no reason why he should not use a large machine if it is hot water. He can hatch three hundred or six hundred just as well.

Mrs. Kedzie—Jones—What temperature do you keep your incubators?

Mr. Matteson—We start at 103. The machine we use at the present time is top heat entirely and we run it at 103. We aim to keep it well up. With the Monarch, where it was top and bottom heat, I had better results by running it 102 the first two weeks. With my machine the temperature is sure to rise a little above that the last week, the animal heat that rises from the chicks is almost sure to bring the temperature a little above that.

Mr. Convey—Sometimes you can't get the same temperature in both ends of these large machines where they are partitioned off. How can you adjust them?

Mr. Matteson—That is very easy to adjust. Just raise the end of the machine that is coldest one-half an inch and that makes the difference of one degree always. If the boiler end of the machine is 102 and the end opposite is 104, raise the boiler end just one inch and that makes a difference of two degrees, and you even up the temperature.

Mr. Convey—If the air gets into the water tank?

Mr. Matteson—It destroys the regulation where you are using water, it disturbs the circulation of the water as well. There is one thing you should be careful about in the use of the hot water machine, and that is to get the air out.

Question—Are you using the same machine that you had a model of up at Appleton four years ago?

Mr. Matteson—Yes, I am, with the

Monarch regulator. I use machines that I build myself.

Question—In your opinion, what is the difference between air heated by steam or hot air or by a furnace or hot water?

Mr. Matteson—I never have used steam, it would get too hot, you couldn't use it.

Question—Well, as between water and hot air, which destroys the most moisture?

Mr. Matteson—There is no doubt but that the air from a hot air machine is drier than from the hot water machine.

Supt. McKerrow—You said that these incubators should be tested by placing thermometers in different parts of the machine. Should not the thermometers themselves be tested first?

Mr. Matteson—Yes, and that is very important and easy. The best place to test incubator thermometers is to place them in warm water that has been warmed up to about 103. If they all record alike, you can use them for this test. If they do not, simply mark each one so that you know the variation.

Question—What temperature do you keep your brooder?

Mr. Matteson—In the winter we begin at 100, but in warm weather not over 93.

Mr. Rietbrock—Since most of us are small farmers, living on our farms, and want eggs for our own use and some to store, should the brooding not really be left largely to the setting hen rather than that the small farmer should go into the matter of artificial brooding, I mean 90 per cent. of such a farmer audience as this is, would it not be safer to just let them follow the processes heretofore known by hatching with the setting hen?

Mr. Matteson—I would say yes, if you are not particular at what season of the year you are to get these chicks out. We all know there is more profit in one early hatched chick than in a dozen late hatched. You have got the business under full control. I have over eight hundred eggs in my machine ready to hatch as soon as I get home, whereas if I were depending upon the hens, I would have to do it as they will. Still, unless they are going to study it in detail and only going to get out a few chickens in the late season of the year, they had better stick to the hen.

Mrs. Howie—There has been a request that you give your plan of an ideal poultry house for the beginner.

Mr. Matteson—I recommend a house—for a winter-laying house, of course, there is a difference. The winter-laying house is the best possible place to breed cholera in the summer time and you should use scratching sheds where you are going to keep fowls in the summer time, instead of the same roosting room that you use in the winter time. All modern poultry houses today are really constructed on the scratching shed plan. In my other houses, where I have no scratching shed attached, I can get just as many eggs, but I cannot bring my stock into the spring in anywhere as near good breeding condition. Build scratching sheds, allowing about two square feet roosting room and about four square feet scratching room for each individual fowl, so you see you have six feet for each fowl. For every twenty fowls we have a window, nine by twelve, twelve lights, and have the windows down close to the floor, facing south.

Question—How many would you put into a house together?

Mr. Matteson—To produce the best possible results, not over fifteen. I put in about thirty-five to forty. My house is built after that plan, but I believe if you were after the best possible results, they should be divided into small ranges.

Question—Would you lath and plaster?

Mr. Matteson—Yes, you have got so much better control of the little red mite by lathing and plastering, that is the roosting room. You should have each nesting box by itself and loose, so you can take it out and thoroughly clean it, brush it all out with a brush and brush off your roosting perches also. Have a dropping board underneath the perches and immediately remove these droppings, using a deodorizer under the perches, so as to leave the house as clean as possible.

Question—How do you whitewash your poultry houses?

Mr. Matteson—We use a brush; probably a spray would be all right, but we use a large, wide brush. We do not use our laying houses in the summer time but very little, because our fowls are all sold off, so we have time in the summer to get ready for the coming winter. I should say whitewash twice a year if you are going to use that house winter and summer.

Question—Do you sell off your laying hens every year?

Mr. Matteson—Yes, sir. The greatest profit is not in a fowl after she has passed the year-old mark. You never can expect to get the same profit the second year as the first year, although she may lay you as many eggs the second year or the third year, you have got to take a small price, because you are going to get the majority of your eggs along towards spring, or the latter part of the winter, and your profits are going to be cut in two.

Question—Must a hen house be entirely frost-proof during the winter, inside?

Mr. Matteson—No, sir, I don't think so. The little Leghorns have not the body to stand the cold that the larger American fowls or the Asiatics have. When I had those I had artificial heat, but I am not breeding Leghorns today, I have nothing but the Barred Plymouth Rocks, and the roosting houses are not frost-proof; when it gets below zero they are pretty sure to freeze, but it is never cold enough to stop the egg flow.

Question—Can't you build hen houses so they are too warm?

Mr. Matteson—No, I don't think so, unless you use artificial heat.

Question—Do you make a speciality of broilers?

Mr. Matteson—I have made more money out of broilers than any other part of poultry farming, but it is a business you have to have large experience in. There are ten dollars to one in the broiler business when you have once become master of the business, but it takes a whole lot of experience to become a master.

Question—What market is the best for broilers?

Mr. Matteson—You need never worry about the demand for broilers; there is always a demand for all you can produce.

Question—At what age?

Mr. Matteson—It does not depend on the age, it is the size, from a pound and a quarter to a pound and a half for the Milwaukee market, live weight, and Chicago wants a two-pound broiler. Milwaukee will pay you no premium on a broiler over a pound and a half.

Question—Do you sell to commission houses?

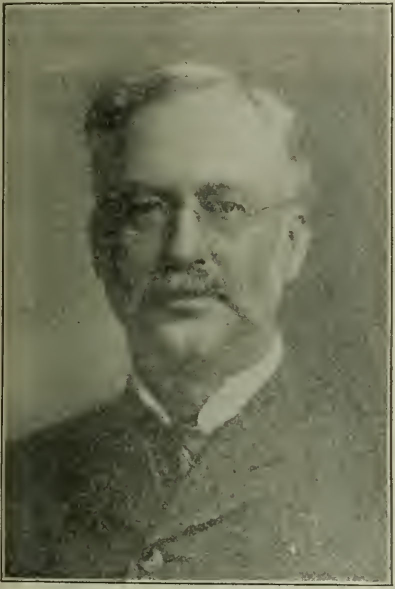
Mr. Matteson—No, sir, I don't. What broilers I have shipped to Chicago I have always been obliged to ship to commission houses, but I drive right in to Milwaukee and sell to dressers. I only live nineteen miles from Milwaukee.

Question—In this locality you would have to depend on commission men.

Mr. Matteson—No, not necessarily; there are always good dressers. There is C. A. Higgins, 148 Madison St., a good reliable man, a dresser, and J. M. Grasher, 70 Juneau Ave., is also a good, reliable man, both of Milwaukee, and they will always pay more than any commission man will pay you.

# AGRICULTURAL POSSIBILITIES OF CENTRAL AND NORTHERN WISCONSIN.

W. A. HENRY, Dean, College of Agriculture, and Director Agricultural Experiment Station of Wisconsin, Madison.



Prof. Henry.

In August 1895 I was in a town in a western part of a state bordering on the Missouri river westward. It was in the semi-arid region—and arid only it was at that time. The thermometer registered over 100 degrees Fht. day after day, and a scorching, blistering wind from the southwest was rapidly parching to brownness the exceedingly scanty herbage. In this particular region the settlers had not raised a crop for the two preceding years, and this year, the third, was worse than either of the others. A pitiful sight it was to see people located in a region without anything to eat and without water to quench their thirst in the summer time, or fuel to warm their houses in the winter. White-topped wagons were crawling to the westward and some to the eastward, carrying distressed, poverty-stricken families to some other spot in the hopes of finding homes. Witnessing this distressing scene, I thought to myself "what a pity it is that these people do not know of northern Wisconsin and its many possibilities for home building. In that region, though droughts may sometimes annoy, they never extend through the entire season, and some crops are always assured. No one who will work in even a half-hearted way in the new north, need suffer at any time for the necessities of life, and thrifty ones may soon gain a competence."

Revolving these thoughts in my mind, I came east and asked permission of the university to prepare a handbook on northern Wisconsin, describing its possibilities for the home-seeker. A Regent of the university, interested in agriculture and having the welfare of the state deeply at heart, said to me: "Do you not feel that you are perpetrating wrong in advertising northern Wisconsin as a region suitable for farming? I have passed through that country several times on the railroad and never saw a piece of land that I would take as a gift. Surely you are making a mistake in inducing people to settle there." I replied that I thought I was more familiar with the country than was my Regent friend and that I had studied the agriculture of the northwest pretty thoroughly and could see no reason as to soil, water supply, summer temperatures, length of season, or anything else which would prevent that region from becoming a good agricultural country for the most part. The legislature kindly made a small provision for a publication and we issued from our Station what we called "Northern Wisconsin. A Handbook for the Homeseeker." Of this book, covering 200 pages, with nearly one hundred illustrations, 50,000 copies were printed and sent over the country. It contained the findings of not only myself, but of Professors F. H. King, E. S. Goff, and J. A. Craig, in regard to the agricultural possibilities of the northern half of our state. Many of those who read this article are familiar with this book and the great work it accomplished. They remember that it was the first general means of awakening an interest in our new north. Previous to that time the lumberman had ruled supreme and his ideas as to good and bad lands were predominant. To a lumberman a district carrying much pine trees was a fine country—for timber. To this man every region without pine trees was "worthless," or practically so. These same men, however, had observed how grass grew in the clearings about the lumber camp. They had noticed that grasses and clovers, springing up from the droppings of teams along the "tote" roads and logging roads, grew luxuriantly and to a wonderful height. They knew from observation that horses and cattle were fond of these grasses when they had an opportunity to crop them. They knew that in some cases settlers on their little clearings had raised not only good crops of grasses and clover, but splendid crops of oats, potatoes, rutabagas, beets, and even corn. Despite this we were told by these people that the country was of little or no

Farm of Wm. Miller about 3 or 4 miles from town. Photograph of homestead showing garden of small fruit in foreground with his residence and outbuildings in background. Rusk, Dunn Co., Wis.

value where the timber had been removed. So thoroughly imbued with this idea were the lumberman that in many cases after removing the pine timber from tracts of land carrying good hardwood they would no longer pay the taxes on such tracts, even though the assessment was merely nominal, and allowed them to be sold for taxes.

How Pie-plant Grows in Langlade Co.

The easy and quick possibilities of prairie life and prairie farming drew our people seeking homes westward and northwestward to the plains. During the rush to the Dakotas trainloads of people were carried to the west and northwest, sometimes through these very harwdood lands, in order to find a home in a region of drought and hardship. Many a person was carried by land selling at but two or three dollars per acre, to purchase land at higher prices with far more uncertainties of making a sure and safe home. But times have changed. Now "Northern Wisconsin" is a term heard on every side and settlers are crowding into this region in large numbers. Best of all, our Handbook of Northern Wisconsin, circulating as it did among our own people, awakened an interest among residents of this state in agricultural lands of their home state. Thousands of farmers living in the southern part of the state were induced to make trips to the northern part of the state and study for themselves the agricultural possibilities of that region. This is exactly as it should be. People familiar with agriculture in the southern half of the state are the very class of people to build homes in the northern part. This is especially true of the sons and daughters of our farmers. Familiar with our customs and practices, and knowing of our interests socially and politically, these people, drifting northward, become the very best of farmers and citizens.

They are proud of Wisconsin and loyal to its every interest.

### Some of the Products of Northern Wisconsin.

Thousands of readers of this article need not be told what can be produced in the northern half of our state. For the benefit of others let it be noted that grasses and clovers flourish particularly in this region. Timothy grows everywhere and Kentucky blue grass seems indigenous, for one finds it creeping along the roadsides and through the bare spots in the timberlands. The clovers are particularly at home. Red and alsike clover usually give two crops a year. These plants are not so easily killed out in winter as in southern Wisconsin, because when winter comes on in our northland cold weather prevails continuously and there is the absence of freezing and thawing which is so fatal to clover life. White clover is found everywhere in the north, and, like blue grass, seems indigenous. We all know that the potato plant thrives best in a cool summer climate on rich soil. Central Wisconsin is already widely advertised for its great crops of magnificent potatoes. In that region this tuber has paid off many a mortgage. What is true of the central portion of the state holds equally well for large regions fartner north. Northern grown potatoes are more completely filled with starch and possess a higher, better flavor than the soggy, half-developed specimens of the same tuber found growing farther south in this country. Rutabagas, sugar beets, common peas and garden vegetables generally are of the highest quality when grown in the north. A plant that should be particularly dwelt upon is the common field pea and garden pea. We all know that Canada grows a choice brand of field peas. Northern Wisconsin can easily equal Canada. The same variety of pea vines which will grow 2.5 feet high in southern

Cranberry marsh of Gaynor Bros., about five miles west of Grand Rapids. The ridges running through the marsh formed from the "scalping" removed from the ground previous to planting.

Wisconsin will stretch up to 3.5 and even four feet in northern Wisconsin. The yield of field peas is from twenty to thirty-five bushels per acre. They are free from the pea weevil. Peas can be grown for hay, and the grain is an excellent food for dairy cows and fattening hogs. In the not distant future there will be factories established all over northern Wisconsin canning this delicious vegetable when in the best stage of preservation.

### Indian Corn.

But I am asked "What about Indian corn; will it grow in northern Wisconsin?" By the proper selection of varieties and growing one's own seed, this greatest of all crops in the Mississippi Valley will become a common one all over the north. If the farmers can grow corn as far north as Winnepeg, Manitoba, as they are doing, what is the use of questioning the possibilities of growing corn in northern Wisconsin? Oats, barley and wheat, especially the former, yield good crops in northern Wisconsin. The finest field of oats the writer ever saw was grown in northern Wisconsin. Under favorable conditions as much as one hundred bushels of oats per acre have been produced, although the common yield is from forty to fifty bushels per acre.

With all of these facts firmly established, there is no need of longer discussing what crops can be grown in our new north. The next question is, "What industries will flourish there aside from mere crop growing?"

### Dairying and Cheese Production.

First of all let it be known that northern Wisconsin is particularly adapted to dairying, and in dairying cheese production should be the leading line. The farmers of Iowa and northern Illinois can produce milk which will make fine butter. These farmers, however, cannot send milk to the factory that will make the highest grade of cheese. Milk for cheese making must be purer and more wholesome than that which will make good butter. Now, because of its abundance of luscious grasses, its healthful climate and its cool, purer waters everywhere present, the farmers of northern Wisconsin have special advantages for the production of milk of unusual excellence, and from such milk there can be made a quality of cheese that is equalled nowhere else in all this great country. We all know the high quality of Canada cheese. Wisconsin's climate is much the same as that of Canada, the difference being in our favor if anything. Farmers should endeavor therefore to secure cheese factories and engage extensively in the manufacture of cheese, remembering always that if they will follow reasonable rules they can soon be producing a brand of cheese that will bring a higher price in the market than that produced farther south, and that a reputation once established will be worth a great deal of money to them. In order to rear the calves and thus keep up the herds, it is well to have a combined butter and cheese factory, making butter in the early spring when the calves need the milk, and then turning to cheese making later on when that article commands a good price and the price of butter has fallen.

### Sheep Raising and Pork Production.

Next to dairying comes sheep rearing, which should become a most extensive industry in this great region. There are many kinds of vegetation in our north suited to the sheep. Mutton produced in that cool summer climate will have a firmness and flavor unequalled by the softer, more greasy product from sheep reared farther south. The Wisconsin Agricultural College has been an easy winner in competition with other institutions showing sheep at state and international fairs. This is in no small measure due to our superior climate, and if we can produce better sheep than the average at Madison, then our farmers still farther north can easily lead us in the excellence of their muttons. Pork production will also prove a most profitable industry in our new north, because of the abundance of clover pastures, the numerous by-products from the dairy, the fair yields of corn and especially the large crops of field peas which can be raised. By growing rape and peas and turning the hogs into these fields to do their own harvesting, and finishing with a little corn, pork can be cheaply produced. Northern Wisconsin should raise no grain for sale; neither should it produce hay for the market. Hay and grain produced for direct sale means the ruination of the agriculture in any country where such practices are followed. Farmers should let the hay go off their farms only in rare cases. Feed all these products at home. keep up the fertility on the land and ship to market only finished products like butter, cheese, eggs, pork, mutton and beef.

### A Word of Caution to the Prospective Buyer.

And now a word to him who reading this article thinks of going to our northland in search of a home. Let me say first of all that lands have risen in price very materially from five or six years ago. Then values were too low,—now they are approximately their relative worth as compared with other regions, though there are still bargains. Land agents are numerous and one will find no trouble in securing ample assistance in making his selection. How shall one proceed to secure a good piece of land in northern Wisconsin at a reasonable price? First of all let the landseeker deal only with reliable individuals or reliable firms. Remember there are those in northern Wisconsin who are caring only to sell lands, take in all the money possible and make the most out of the opportunity. It was ever thus! Remember too that there are large numbers of agents who will sell property, making truthful statements and showing things exactly as they are. Remember further that there is a great deal of land in northern Wisconsin that ranges from worthless up to only fair quality. In some regions there is sand with a sand sub-soil. Such soils may give good crops for two or three years while still filled with vegetable matter. As soon as this vegetable matter decays, winds will blow the sands, the moisture will dry out and in seasons of drought the parched, illy nurtured crops will burn up and yield little or nothing. Avoid such lands. Then there are gravelly ridges which are poor in fertility and quickly burn up in times of drought. Such lands may be suitable for sheep farming, but no one should think of cropping them regularly. In other places there are worthless swamps. There are stony areas in northern Wisconsin; bowlders varying from the size of one's fist to many tons in weight thickly strew the ground in places. Often the soil thus bowlder-covered is of excellent fertility, and usually it is good grazing land. Where the bowlders are not too thick they can be gathered into piles and fine farms made. In places they are so numerous that until land values have greatly increased one had better let such tracts alone. The prospective settler should further know that good and poor lands in northern Wisconsin are greatly intermixed. Because one section of land or one township is excellent for agriculture, it does not follow that the next section or the next township is equally good. The change from poor to good lands and the opposite is often very sudden. One should never attempt to buy lands by correspondence, nor will writing letters bring satisfactory information. It is best to take ample time to visit different sections and examine many offerings before making the final decision. Then one should be certain that he is buying land which has been shown him, and not some other tract.

Apprised of all the above facts in

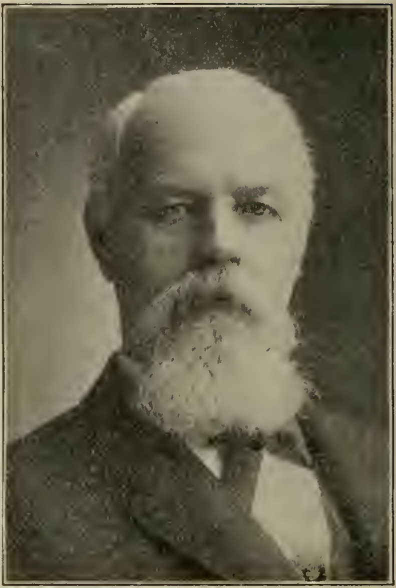
advance, the land-seeker need make no mistakes in purchasing if he will but move cautiously, deal with reliable firms, and take his time to look over different sections. Let him never forget that while northern Wisconsin is a good region for farming, it nevertheless contains large tracts of land that should be severely avoided. In determining whether lands are suitable for agriculture and whether the soil is rich or not, let the land-seeker be guided largely by what settlers already in the region are doing. If the soils seem of fair quality by direct observation and if the crops the more thrifty settlers are growing are satisfactory, then one need not hesitate about buying similar lands. Railroads penetrate every portion of our new north. There are settlers in every township. Roads are largely laid out and the new-comer will have but few privations to suffer. If he find the right kind of lands, he will soon have a farm on which he can grow crops of some kind every year without fail. He is sure of markets. He is certain of lumber at reasonable prices, of abundance of fire-wood, of pure water, and of living in a region where there is no malaria or other diseases incident to the soil or climate. Thus his conditions are very different from those living on the plains where rainfall is uncertain, where lumber must always be hauled from the town lumber yards at high prices, where fuel is scarce, and where neighbors are far distant and advantages of civilization but scant indeed.

## DISCUSSION.

Supt. McKerrow—I see in this room men who have not only had experience in taking off the first crop in central and northern Wisconsin, but who have gone a little farther and opened up farms and know whether they have got any returns from those farms. I mean such men as Mr. McMillan, Mr. Quaw, Mr. Rietbrock, Mr. Salter, and others. We have other men in this audience who ought to know about the possibilities of farming, who have come from southern Wisconsin and settled up here, such men as Mr. Warner, Mr. Hansen and Mr. Scott. We would like to hear from these gentlemen.

Mr. McMillan.

Mr. McMillan—I am not a farmer. I am what is called an agriculturalist, and the difference between a farmer and an agriculturist is, that the farmer takes money off of the farm, while the agriculturalist puts it into the farm. Professor Moore forgot to mention one thing that northern Wisconsin has done, and that is that they went into the legislature and got permission to establish two Agricultural County Schools. Where is your Southern Wisconsin Agricultural School? You have got one down at Madison, but we propose to have one in every county. What has been said here reminds me of the old times when Louis Rivers' loghouse, hotel, saloon, store and everything else combined, was the only house in Marshfield. I came out here one day afoot, traveling a mile and a half through tamrack swamps, and I met an old gentleman here, and he said to me, "Do you know what you have got in this country?" I said, "Yes, we have got some pine over on the river, I don't know what you have around here." "Don't you know what kind of soil you have here?" "Well," I said, "I am not paying attention to soil, I am trying to get in a few logs." So he went on and told me how he had gone to lumbering in Steuben Co., N. Y., he had just enough to buy a forty acre lot, and he cut off the timber and had enough to buy another lot, and he kept repeating that until he cut off all the timber, and then, he said, "I didn't have money enough to get out of the country, we had to go to farming, we couldn't help ourselves, and we have got rich." And he said to me, "Young man, mind what I say to you, that is what you will do." And every word of that has proved to be true, I have got rich farming, as riches go in this locality. That man knew what he was talking about and he had learned to judge the soil by the height and kind of the trees. The trees in this locality grew twice as long as in any other locality that I ever was in, and I have traveled the woods of pretty nearly this whole state. I would like to hear what Sam Quaw can tell us about these things. We call him our farmer lumberman, and he is a good talker. He came from Washington county, New York, where they have to tie the children to stakes to keep them from rolling down hill.


Mr. Rietbrock.

Mr. Rietbrock—Mr. Chairman, most of the farming that I have done of late has been of the agricultural kind that Mr. McMillan spoke about, but I suppose somebody has to do that kind. According to my theory, to make a farm profitable the farming must be carried on by the owner of the land, and he must be that stripe of a man that is willing to go out and do some work, good, hard hustling, and if he does that he certainly succeeds at farming. My experience, after a good many years, teaches me that in no calling in which a man can engage can he be so sure of a good living for the present and something laid up for the future as in farming. I was born in Wisconsin on a farm, worked on a farm until I was past twenty-one years of age, and I was considered a good farmer, too, because I was a good worker, and while we did not live in luxury, and we lived by hard work, no man ever came to the door hungry but what got something to eat, there was always plenty there. I afterwards drifted into the city and was practicing law in Milwaukee at the time of the great financial crisis of 1873. I saw many things during those years. I saw thousands of men, heads of families, in the city of Milwaukee, ready and anxious to work, and they could get no job there. A thousand men were turned out of the rolling mills, five hundred men were discharged from the nail factories, the city was full of people who were willing to work, but could get no jobs. That was from 1873 to 1876. Now at that time I was well enough, I was practicing law, but I came in contact with a great many of these people that were anxious to get something to do, and, having had experience on the farm, it occurred to me that their relief was on the farm, and that there was relief for them there. In the spring of that year, I cast about for a place where they might be safely sent, and during all the summer long, every four weeks I made a trip into northern Wisconsin. I had heard something of northern Wisconsin, although it was an unknown wilderness to the people of the south, but every four weeks I went to Wausau, and scattering out from there to the sparse settlements through that country I took an account of the growth that had been made by the forage and grain crops planted upon small farms. And I will say this, gentlemen, I was astonished at what I saw, had anybody told me what grew and how it grew way up in that country I would certainly not have believed it any more than did the majority of people to whom I talked during that time, and for years thereafter, believe me. The majority of people believed that northern Wisconsin was not inhabitable. Unlike my friend, Mr. McMillan, I was not hunting through the woods for pine trees. I was scouring northern Wisconsin for a territory that was fairly short of pine, but that was distinguished for hard wood.

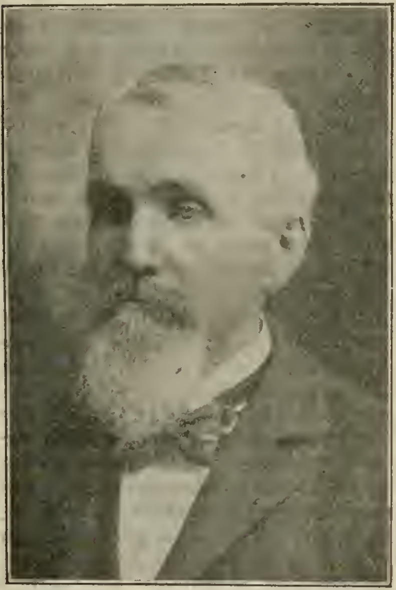
Mr. McMillan—There is where he showed his good sense, you see.

Mr. Rietbrock—Well, I don't know that I had any great responsibility in the matter, but I at least thought I had the responsibility of finding a place where these poor people I spoke of could get along upon substantially the plan that my father had succeeded on and hundreds of other families that I know of had succeeded, so that it was agriculture that I was after, and I found there what I thought was the finest agricultural district to be found in the state of Wisconsin. I walked through it from north to south and from east to west and it was a very interesting walk. It was never a hardship for me to go into the woods and stay ten days and walk every day on straight lines to see how the country would open up.

Now, I will say this, for a good many years it did not open up as rapidly as I had hoped, but I relieved the city of Milwaukee of forty families, I put them in Marathon county, and pretty nearly every one of them is still there.

became very much interested in that country, and I am now. The agricultural section of northern Wisconsin is no small territory; it is more than two hundred miles in extent from east to west and over a hundred and sixty miles from north to south, and you will find the majority of the land to be good agricultural land. Now, I call it good agricultural land that is either a clay loam, a sandy loam, or a mixture that will work up fairly well, and that is the character of that land. A few years ago the great majority of people in southern Wisconsin had very little conception of the condition of climate up there, they thought it must be certainly objectionable, but I do not find it so. This is a northern country anyway, Wisconsin, and Iowa, and the best part of Illinois, are really in the north; we are people of the north, and you will all admit that people belonging in a northern climate have generally, in energy, far surpassed the people of the extreme south. This northerly climate is well adapted for people who have been raised anywhere in the state of Wisconsin; one crop of wheat, rye, oats or barley is all that you expect to raise in a year, and I undertake to say that as good a crop is raised in northern Wisconsin as in any of the adjoining states. The crop is abundant, the soil is good, and when it comes to the question of the agricultural possibilities of northern Wisconsin, I can only say that I believe it will astonish you people from southern Wisconsin as it did me, if you will look into the matter.

Mr. Quaw is the president of the Marathon County Agricultural Society. That Society has made an exhibit at the state fair and for three years in succession it took the first prize over any other county in the state on its various grasses, grains and fruits.



Mr. Quaw.

Mr. Quaw—Mr. President, Ladies and Gentlemen:—My experience in Marathon county covers something over thirty years, and I have had time enough to modify my ideas considerably. I came to Wausau from the state of Iowa, and I remembered very well what a grand farming state Iowa was, and I thought that any man who talked about farming in this section of Wisconsin was a fit subject for the lunatic asylum, because I was quite convinced it was north of the farming belt, but I have changed my mind very materially, and I can honestly say I have never been in any place where the farmer can become more prosperous or where any better crops can be grown. I have traveled a good deal through Illinois, Indiana, Ohio and Iowa, and taking the general appearance there, it does not compare with our dairy buildings and other evidences of prosperity that our Marathon county farmers show today.

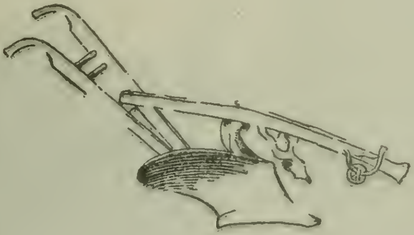
You go out among the farmers all through here, and you will find them with good farm buildings, good houses and splendid barns. If I were starting today without any money, in debt, I would rather start right up here to make a home and a farm than anywhere that I know of. I think there is no county in this state, or in the whole section of states, that has fewer farm mortgages than we have in Marathon. If you find a farm that is mortgaged, or a man in debt, you are pretty sure to find him a young man just starting out in life, or a man who has come here from Europe without any means, but in a very few years you will find him out of debt.

There are about $3,000,000.00 on deposit in the banks at Wausau, and that money is not from the business men; my experience is that business men can always use just a little more money than they have. This money comes from the farmers. Any one to realize what this country is must drive through it in the summer months during the growing of the crops to appreciate the country we have. I remember a little trip that I took with Mr. Head, the superintendent of our Marathon county asylum. We had heard that Mr. Rietbrock had a very nice dairy farm, and we went there, and I can assure you it is one of the nicest I ever saw. We drove from Edgar over to Athens, thirteen miles, it was in the early haying, and I never in all my experience saw better growing crops anywhere. I saw a winter wheat field, the wheat was standing up above the fence, just about as level as though it was clipped off with the shears, a beautiful sight, and I was interested to know what the wheat threshed out. I heard afterwards they got from forty to forty-five bushels of winter wheat to the acre, and I don't know where you can do much better than that.

I am something of an agriculturalist myself and we have been raising corn on our farm up here for twenty years, and last year was the first year that we have ever had a failure in the corn crop, and that was our fault, not the fault of the corn. I never go away from this section of the country in my travels without thinking there is no better chance for a man to start, especially a young man without much means to get a hold, than to take a start and settle right up here in this section of Wisconsin.

Mr. McMillan—I take exceptions to being classed with Mr. Quaw; he is not in our class at all, he makes money out of his farm, whereas we agriculturists are putting it in ours all the while.

Recess to 1:30.



## AFTERNOON SESSION.

**The Institute met at 1:30 p. m. MR. CONVEY in the chair.**

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## CORN.

**D. B. FOSTER, Fairchild, Wis.**

Longfellow's Indian Legends tell how in answer to Hiawatha's prayer to the Great Spirit

"For the profit of the people
For the advantage of the nations"

Indian corn was sent in the form of a young man who proclaimed himself

"I the friend of man, Modamin
Come to warn you and instruct you
How by struggle and by labor,
You shall gain what you have prayed
for."

Wood Co. Corn Sept. 9th, Planted May 20th.

And with none of God's good gifts to man is the necessity of well directed, intelligent labor any greater, nor any more abundantly rewarded, than in the growth of the corn crop, and the same reply is appropriate to the man who complains of corn "not doing well' as was given by the noble Spartan to his son, when the boy complained of his sword being too short, to "add a step to it."

The fact that statistics show that Wisconsin raises more corn per acre than Illinois, is complete evidence that we have added some extra steps to our corn fields, and put them where they would do the most good too. With corn those steps should not all be of the leg-wearying kind either, brains are first-rate fertilizers to produce those thousand fold yields which pertain particularly to this "King of cereals," and the farmer may well sometimes drop out the showy "lillies" from his scripture lesson and read it instead, "Consider the corn plant, how it grows."

Professor Henry in his "Feeds and Feeding" says, "Were a reliable seedsman to advertise Indian corn by a new name, recounting only its actual merits, while ingeniously concealing its identity, his words would either be discredited or he would have an unlimited number of purchasers for this seed novelty, at almost any figure he might name."

What a royal plant corn is anyway! Springing from that small, insignificant kernel, but with an ambition fired directly by the sun, it rears its plumed head afar and away above any of its brother cereals, till at the end of its hundred days or so, and after pointing a splendid moral to groveling man, it yields up to him its ten, eleven or twelve feet of lordly length, and its two thousand fold yield of food for man and beast.

### Good Seed the First Essential for a Good Corn Crop.

The principal conditions for a good corn crop are, good seed, good soil and good cultivation. The seed corn should always be dried and kept dry by artificial heat. The kitchen attic, if capable of ventilation, is the ideal winter quarters for seed corn.

Before planting, the tip and butt kernels should be rejected as being cripples and of questionable vigor and vitality. The seed should always be tested before planting and under as nearly natural field conditions as is practicable to provide, and seed that will not show more than eighty per cent. of germination should never be planted at all; have your test consist of one hundred kernels of each lot or variety of seed and then you won't have to use a pencil to figure the percentage of poor ones.

### Preparation of the Soil.

The soil should be prepared by fall plowing as deeply as possible without turning up too much new soil, and should be spread during the winter with fresh manure right from the stables and dragged in the spring, as soon as the soil is in fit condition, in order to conserve moisture; and as thoroughly and deeply worked as is possible with disk, cultivator, and harrow, just before planting, to ensure a firm, even, mellow seed bed, a bed that will be just as comfortable and inviting to those kernels of corn as you want your bed to be when you need to accumulate strength for the morrow's efforts.

The Foster Girls and "Dolly."

### Sowing the Seed.

Then, if the season is right, and the weather is fine, plant the seed just deep enough to ensure moisture from below and yet shallow enough to secure warmth from above, and firm the earth all around it with the roller, so as to give the seed a perfect moisture supply, which it cannot have if an air space is left next to the seed, as the result of improper covering. The roller should always be immediately followed by a harrow, so as to prevent evaporation of the moisture from the soil.

### Cultivation.

From this time forward the surface of the soil should be stirred after every rain, as soon as it is dry enough to work well, for the purpose of conserving moisture for the use of the young plant, and by checking evaporation to warm the surface, and by working air into the soil to set up a fermentation, and a rusting process among the soil particles, which will produce or manufacture plant food in abundance, and just where the next rain will carry it down to the young roots.

This stirring should be shallow and may be done with the weeder or the harrow or the cultivator as the weather, the soil or other circumstances may require. A cold, damp soil may contain all the elements of plant food in abundance, but from lack of oxygen or live air among the soil particles, these elements may be utterly useless to the plant and a plant so placed will fare just about the same as a hungry man would if shut up with plenty of raw potatoes, but with no fire with which to cook them.

### Proper Food for Baby Corn Plant.

How then can we expect our baby corn plant to grow and thrive where its food is not properly prepared for it? Why should we not cook that food, when it can be done by simply letting in the free aid of heaven? Fuel without money and without price, furnished entirely regardless of the rules of the Coal Trust, free to all who will prepare their soil to absorb it. The entire surface of the ground should be kept loose to the depth of two inches all through the season and the last cultivation should be given just after the last rain that comes before that dry spell that comes every summer. Be sure that your cornfield goes into that dry spell with a freshly cultivated surface; if you will do this you may hear your more careless neighbors complain of the awful drought weeks before your corn begins to suffer.

Foster Junior and His Friends.

Thorough cultivation of corn also hastens its season of growth, thereby enabling us to ripen a larger variety of corn in this climate than is possible if careless methods are followed; therefore cultivation practically lengthens our season.

### When Corn Should be Harvested.

Corn should not be fed in a very immature stage of growth. The man who plants a large southern variety to feed as green forage in July, is working against his own interests, because when so very immature such forage is mostly made up of water and is so very bulky that the stock are unable to eat enough of it to give the results which should be expected. More food and better food will be produced by planting an early variety of corn for such early feeding, so that by the time it will be needed for feed the leaves and stalks will be stored. full of real food instead of being a slushy substitute which has been aptly described as "A device of a thoughtless farmer to fool his cows into believing that they have been fed, when they have only been filled up." Careful investigations by scientists have demonstrated the fact that one hundred pounds of the corn plant when just tasseled, although then at very nearly its full size, contains as much water as the same weight of skim milk, so that a cow would have to eat about three hundred pounds per day of such food to get the twenty-seven pounds of dry matter necessary to satisfy her hunger; while if the stalks were mature, sixty pounds would furnish just as much real nutriment, because the corn plant when mature contains five times the amount of food that it does when just tasseled out.

"Old Grover" and His Charges at the Foster Farm.

These scientists have a way of making some of us farmers look like pretty small potatoes sometimes, but they've certainly got the best of the argument in this case, and if you don't believe what I've told you, just try it. Corn, therefore, whether intended for forage, silage, or for fodder should be allowed to fully finish its life work, but should be harvested just as it begins to die, in order to get the greatest possible good out of it.

### Waste of Stalks and Foliage.

In our climate nearly one-half of the food value of the entire corn plant is contained in the stalk, and in the foliage, and I am at an entire loss to account for the erratic judgment of so many farmers of this state which permits this half of the corn crop to stand wasting in the fields all winter, especially when, as is very often the case, the soil of that particular farm has been starved until it is veritably hidebound in its soil poverty for want of the manure that would be made by the herd of cattle which that cornfield would feed plenteously if only cared for as it would be if in charge of, or owned by a real, true husbandman.

Hail! King Corn! Hail "Mondamin the friend of man," thrice blessed is he who has studied well thy lesson, and who therefore has the advantage of thy fullest favor and who enjoys all of thy lavish bounty, he, the man who has learned of thee

"How by struggle and by labor,
We may gain what we have prayed
for."

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### DISCUSSION.

Supt. McKerrow—What variety of corn do you grow sucecssfully over in Eau Claire county?

Mr. Foster—I used to think Pride of the North was as large as we could grow there and mature it, and some of our neighbors have difficulty in getting that to mature, but the fault is in the cultivation. If you are going to attend to your corn and thoroughly cultivate it, you will find that the varieties that will ripen along about the time or even a little later than the Pride of the North, will succeed, but if you are not going to do that, raise a slightly earlier variety of corn.

Mr. Scott—Would you advise cultivating shallow or deep in this northern country?

Mr. Foster—Shallow cultivation. Do your deep cultivation before planting.

Mr. Scott—For what reason?

Mr. Foster—In the first place, the roots will come near to the surface; two inches is about as deep as it is safe to cultivate. Again, if you go to cultivating deep, you won't do it as often, you can do the shallow cultivation more easily, you will run over it in a hurry and it will do more good. You know it takes five times as much heat to evaporate a pound of water as to raise it to the boiling point, and checking evaporation makes the soil warmer, also saves your moisture.

Mr. Thompson—Two seasons ago was, as you remember, a very hard season for corn. Experiments were conducted in Illinois on the cultivation of corn at various depths. The results of those experiments were put up at the Illinois state fair and I may say that although the average crop of corn that year was less than thirty bushels to the acre, it was shown to be possible to raise it to 100, according to methods of cultivation, varying from two inches deep down to five inches. There was a difference in yield from seventy-five bushels down to twenty-nine in favor of shallow cultivation.

Mr. Scott—As I remember the experiment on George Wylie's farm at Leeds, there was a difference of ten per cent. in favor of shallow cultivation, and a difference of ten days in maturity, and that is an important factor to corn growers in northern Wisconsin.

Mr. Foster—I think that ten days or even two weeks is a safe estimate of the difference of time in maturing between thoroughly cultivated corn and corn just fairly well cultivated.

Mr. Johnson—There is another thing

in regard to shallow cultivation. Many years, in the fall of the year. when we have had these heavy rains, the little roots on top are cut off, by deep cultivation, and a great many fields of corn will go down and lodge. They are not cut off by this shallow cultivation and the corn will stand. In the shallow cultivation, the dirt is turned over right from the roots, and it immediately stops the growth of the root and sets the corn to growing again. The deep cultivation cuts off those roots and nature goes right to work trying to replace them, and in trying to replace them it puts the corn crop back. We have been using the shallow cultivation for twelve years, and haven't had any such trouble. We use the Tower cultivator; it is a knife cultivator and runs within two inches of the top, and we never have trouble by the corn tipping over.

Question—Why do you object to using the tips of the ear for seed?

Mr. Foster—On the tips of the ear, there are little bits of kernels, and the chances are they are cripples and I would rather reject them; the vitality may not be good.

Question—Isn't it a fact that experiments show that they are not low in vitality?

Mr. Foster—I haven't gone as far as that, because I couldn't prove it, but I thought I would take a perfectly safe course and reject hem.

Mr. Rietbrock—Upon this subject, I believe the Indiana Experiment Station have come to a different conclusion, at least Mr. Plumb of the Indiana Station, in his work on Corn Cultivation, suggests the propriety of leaving those small kernels on, mixing them with the others, for this reason. While they will make a good stalk and a good ear, they will be a little later, perhaps three, four, or five days later. and by having them come in a few days later than the balance of the crop the period of pollenization is spread over a longer time, and the result will be that the ears are grown more fully to the tip. The butt kernels seem to be ready for pollenization a little earlier, and you prolong the period of pollenization, but for a few days you enable the whole ear to be thoroughly fructified by the pollen dropping from these later stalks. That was the result of the Indiana experiment. Now, I think this is true, and in looking over my Breeders' Gazette I find, on page 265 of volume 31, that James Riley, a noted Indiana corn breeder and whose corn took first prize at the Chicago fair, advocates the planting of the kernels at each end of the ear, as follows: "When it comes time to prepare my seed corn for planting I resort it, discarding all ears that are not good for seed that were overlooked before and I shell all the grains on the ear. The butt and tip grains are especially valuable. Now I will explain why I do this. The butt grains come in tassel first, then the middle grains and the tip grains come in tassel a week or ten days later than the butt grains. This is Nature's method of supplying pollen to complete the fertilization of all the grains on the ear. This is the reason I defer planting every fifth row in my special plot eight to ten days and then plant it to assist nature to complete her work of fertilizing every grain in the ear. This is a point in the improvement of corn that should be very closely studied, as it conflicts with a very common practice among farmers to nib their seed corn. Now if they want to be convinced that they are wrong, let them select a small plot as I do and take some well-developed ears that are perfectly grained out over the tip. shell off an inch or so of the tip grains and not plant them. Then next year do the same and they will find that in a series of three or four years nearly every ear in the plot will show about an inch of cob at the tip with no grains on it. This not only detracts from the beauty of the corn but amounts to a great loss on the main crop. But, some farmers say, if we shell the nibs we get our corn too thick, as the tip grains are so small too many of them go through the die of the planter. Now I would not recommend planting the smallest tip grains. I run seed corn through the fan with a grader that takes out the smallest grains. Then if we improve upon this point by selecting ears with large, well-developed tip grains, in a few years we will so improve our corn in this particular that we will not be troubled.

"In planting corn no farmer should seed so much corn that he cannot afford to thin it by hand. Thinning corn is an absolute necessity and cannot be neglected without great sacrifice. No matter how many acres of corn a farmer has planted, it will pay him to thin it. Hire a gang of men and work with them and thin the corn. I have several times grown 100 bushels per acre of Boone county White, an entire field averaging 100 bushels per acre, but could not do that unless I thinned two stalks to the hill. The Boone county on rich land should be thinned to two stalks per hill, or, if drilled, sixteen to eighteen inches in the row. The Riley's Favorite will bear three stalks per hill, as it is smaller corn."

Mr. Foster—The objection I would have to that theory, although I don't pretend to be able to talk about it, would be the same objection that I have to the theory of a dairyman who wants to raise a few extra pounds of beef onto the carcass of the dairy animal. There are people who believe in that, but I believe in thoroughbreds, special-purpose animals, and I do not think that nature will fail to take care of herself if we plant good, sound, healthy kernels of corn. I want no cripples in mine.

Mr. Johnson—A little objection suggests itself to me. We have no planter except a hand planter and it will sort out the right number of kernels from the tip of the ear. A good planter which will plant two or three ordinary kernels, will plant six or eight of those tip kernels in the same hill that won't have any ears on at all, and won't amount to anything. I have had considerable experience in raising corn, and I have always taken off the tip of the ear down as far as the kernels are small. The old fashioned way was to thin out your corn, but we can't do that thinning out; we have got to rely on a good corn planter to plant it, and set the planter for two or three, then cultivate, and you are sure to have it.

Mr. Scott—Where these tips and butt kernels are well mixed with the balance of the ear, the difference in yield is very small. I think the experiments at our own station show that what little difference there is in the yield has been in favor of planting both tip and butts, just as it is in planting all of the potato. At the Ohio station I think there has been a little difference in favor of the small kernels.

Mr. Croman—I think there is not much in that theory or taking the kernels of the entire ear. I live in a township where this year, according to the report of the secretary of state, we have grown more corn than any other township in the state, and we have experimented year after year to find out what kernels on the ear had best be planted. We select the center kernels every time, and if you make an experiment this coming year by taking an ear of corn and shelling the tip end and the butt end and the center, and planting them in rows by themselves, you will find out which of the kernels to plant. What we want and are after is an even stand of corn, and the only way we can get it is to plant even seed. Try it for yourselves. We have tried it years and years and we today are not picking our seed promiscuously through the field, but we plant a field of corn for seed and seed alone, and then we select, and by so doing we have made sure of the maturing qualities of our corn.

Question—How do you get your seed corn?

Mr. Foster—I get it from one of my neighbors who does not grow corn quite as thick as I do. His field is quite a distance from any other cornfield and it does not get mixed. He can take care of it better than I can and cheaper. He grows it especially for me, I engage it from him.

Question—Do you have much experience in having barren stalks?

Mr. Foster—I have not gone into the barren stalk business very much, but I was going to mention that in connection with the stalks that came up from these cripples from the end of the ear. If you will make a study of our corn territories of the south, you will find that they are selecting kernels and breeding corn for the different elements they contain, therefore they select a perfect kernel. They also believe in de-tasseling the barren stalks, because they don't want this corn they are breeding to be fertilized by the barren stalk, and I think we do not want our corn fertilized by these little nubbins.

Question—Do you know that these nubbins come from the cripples?

Mr. Foster—Yes, I think I do.

Mr. Thompson—If a man is going to sow wheat or oats, doesn't he pick out the best he can find, and doesn't he go to that part of the field where the oats stand up the best, where the head is the longest and the kernel is the plumpest? And if he is a man right up to his business, doesn't he look carefully after all these things so as to have the very best seed? Now, when he picks out his seed corn, why shouldn't he go out into the field and pick the best he can find? We would not plant small kernels of wheat, you couldn't sell a man who was anything of a farmer screenings for seed. He will have the best or nothing, and the best is none too good for any farmer. We want to raise the best and those that raise one hundred bushels to the acre of corn know where they get their seed from. This factor of pollenization can be brought about by different methods. You can plant four rows of corn and then leave a row and plant that two weeks later. That is one way to pollenize your corn and extend the time. Leave out a row and plant a week or ten days later, and that will make it work all right.

Question—How do you plant your corn?

Mr. Foster—I prefer planting in hills with a corn planter.

Mr. Scribner—Don't you think that in this northern country by using hand-planters they get the corn in too deep, and in that way injure the crop materially, not only in regard to the quality, but in regard to the time of maturity?

Mr. Foster—Sometimes, and also in planting with hand planters, oftentimes the corn is not properly covered. The ground should always be immediately harrowed with a light smoothing harrow after either hand or machine planting, the holes left by the hand planter should be thoroughly filled up.

# THE SILO.

**W. F. STILES, Lake Mills, Wis.**

Mr. Stiles.

A silo is a building that is constructed for the purpose of preserving in a succulent condition the forage crops of the farm. Corn is the one that is principally used. This mode of preserving forage for winter feeding was first discovered and put into practice in the sugar beet districts of Europe. It has reached its highest perfection and utility, however, in the dairy sections of the United States and Canada.

The first silos were long, narrow trenches where the beet leaves and pulp were placed for preservation and convenience for winter feeding. The evolution of the silo has been gradual and constant, and today, instead of the long, narrow trench, we find a cylindrical-shaped structure, the longest dimensions of which are perpendicular rather than horizontal.

The first modern, or round silo, was thought out and planned by Prof. F. H. King, when he was connected with the Wisconsin Experiment Station.

The three essentials to be secured in constructing a silo are these: The building must be perfectly air-tight, the walls must be strong enough so that they will not spring or crack from the pressure on the inside, and it should be of sufficient depth in order that the feed placed in it will pack tight enough to exclude the air.

### The Proper Dimensions for a Silo.

Another important point gained in a deep silo is that for the size of the building it will hold more feed than a shallow one, as the pressure will cause it to pack much more closely at the lower portion. This heavy pressure will also help exclude the air and thus help preserve the silage. A silo should not be made less than twenty-five feet deep.

In planning the dimensions of a silo, one of the best rules to go by is to have the diameter in proportion to the number of animals to be fed, and the depth in proportion to the feeding season. As the silo is opened at the top, and the entire upper surface gone over every two or three days, in order to prevent it from spoiling, it will readily be seen that if the surface is too large one would either be obliged to feed more to the stock each day than is necessary, or constantly be feeding silage that is more or less damaged.

A silo for a herd of twenty head of milk cows and twenty head of young stock, for a feeding period of two hundred days, should be sixteen feet in diameter and twenty-eight or thirty feet deep. Where one is intending to feed silage the entire year, it is usually best to put up a second small silo for summer feeding.

### The Location of the Silo.

The silo should be as near the feeding barn as possible, so that the work of feeding may be done with the least amount of labor necessary. Where the nature of the soil will permit, the silo should be dug down into the ground from four to six feet below the feeding floor. If the barn is on a hillside, the silo should be located on the upper side of the barn. The portion that is below ground in most cases is the most satisfactory. Usually it can be built cheaper than the upper part; t is more convenient in feeding and filling, and there is less danger of this portion freezing in winter or spoiling as rapidly in summer.

### Material to Use in Construction.

As a silo should last fifty years or more, it is not wise to use material in building that will soon decay or is apt to warp or shrink, and thus throw the silo out of shape. Various kinds of material have been used in their construction. Some have been made of wood, some of stone, some of brick, and some of cement or grout work, and some have been made of a combination of all of these. All of these various materials, whether used either singly or collectively, if put together n the proper shape, have given satisfaction. Just which kind of a silo it s best for a farmer to build will depend upon the relative cost of these various substances in his locality. The part that is below ground should not be made of wood.

As the outward pressure is considerable on the walls of a deep silo near the bottom, care should be taken to have the wall strong in this portion. If this part of the silo is made of stone, and they are the common or irregular shaped bowlders, it is a good plan to imbed in the wall near the outside, every three or four feet, a strong iron hoop, or a series of short connecting rods extending entirely around the wall. Especial care must be taken in regard to this around the doors. If the silo is made, with a continuous door, rods must be used frequently to prevent spreading. Down at the level of the feeding floor the rods should be six feet apart, so that a man can walk through conveniently with a basket of silage.

If the silo is to be made of stone or grout, extra care must be taken with the foundation. If the silo is twenty-five or thirty feet deep, there will be an immense pressure in the bottom of a stone wall of this height. Should the foundation settle much, the wall will crack and thus the air will enter and spoil the silage near the wall all of the distance from the crack to the upper surface.

The bottom of the silo should be made by pounding small stones in closely, and covering these with grout. This should extend out under the wall. The mortar used in the wall should be of the best. Some of the cheaper cements and good sharp sand will make a good strong wall. The inside of the wall must be plastered with a half inch coat of cement, made by mixing one part of good Portland cement and two parts of good sharp sand. The inside of the wall should be made as smooth as possible. If the upper part of the silo is made of wood, care must be taken to have the inside of the wooden section flush with the inside of the lower part. The inside of the wall should be perpendicular and straight from top to bottom.

It is best to put some kind of a roof on the silo. The shape is immaterial, but it should be supplied with a window for light, and one or more for ventilation. The damp air that is constantly raising from the top of the silage will soon rot the roof if it does not have a good chance to escape.

In closing let me say to anyone who is intending to build a silo, put up as good a one as you can. Oftentimes those that cost the most in the beginning are the cheapest in the end. At the present time it looks as though the grout or cement silo would be the best where good gravel or crushel stone are abundant. The silo is no longer an experiment, and where properly made and rightly used it has proven to be one of the best paying buildings on the farm.

## DISCUSSION.

Question—How thick should the stone wall be for a silo twenty-five feet deep?

Mr. Stiles—It is usually most convenient to build it at the bottom about two feet thick, using common bowlders, and you want to be sure and get the dirt pounded in back of the wall good and tight so it won't spring, but as you get up near the top the pressure is less and less and if the wall is a foot thick that will be thick enough for the last ten feet.

Question—What do you mean by bowlders?

Mr. Stiles—Irregular shaped stone that are quite abundanc in many parts of the state.

Mr. Goodrich—What have you to say about the stave silo?

Mr. Stiles—Many have been built and some have given satisfaction, at least for the first year or two, where they are well built and the staves are of good material, a well built silo of that kind will last a good many years, but as a rule it is not best to build a stave silo, because it is hard work to get lumber of equal quality and durability, and some staves will shrink more than others, and it is sometimes hard to get it to stand up in place. Except you are going to put up a silo for three or four years on a rented farm, I would not advise a stave silo.

Question—What objection is there to building a stave silo and then after it has shrunk a little to cover with lath and plaster on the inside?

Mr. Stiles—I don't know of any real objection. I would have an idea that all of it would have to be above ground and it would be apt to freeze a little more in the winter than if you dig down into the ground.

A Member—Stone with us is very expensive; wood is the only available material. Mr. Gurler has those wooden silos cemented on the inside and they are giving him good satisfaction he says. He stated last fall that after one had had twenty years' experience in silos, as he had, that they would come to the wood silos cemented inside. Of course in many places you can't get a wall built of stone, even on a good foundation. You think you have a good solid foundation, and then after it stands awhile it begins to crack and open up. I think where you can have it, it is all right to put staves above the ground. I have used that kind ten years.

A Member—The depth of the silo is a very important consideration. I think they should be built thirty to thirty-five feet, especially where you can get into the ground six to eight feet.

Mr. Stiles—I think some of the gentlemen here misunderstood the statement that the silo should be fourteen feet in the ground. Down with us, the ground is very rolling, there are a good many little hills, and we usually try to build the barn on the hillside, so we drive right into the upper part of the barn. Now, where you build the silo on the upper side of the hill, if you go down eight feet below the feeding floor on the upper side, it will be twelve to fifteen feet below the ground, but it is not like digging fourteen feet straight down in the ground, we only have to take the silage up four feet. About this question of digging down where the ground is not safe, of course it is not advisable to dig down if you can't get a foundation. In a case like that, you would be obliged to build it almost entirely above ground, and then you have got to go up in the air quite a ways, for it is not best to have the silo less than twenty-five feet deep.

Question—Would you advise building a silo of stone where you have got to pay four to five dollars a cord for the rock?

Mr. Stiles—No, I would not. I should build it of the cheapest material you can get in your locality, and if you can't get stone, I would only provide stone for the foundation. You must have grout or stone work for the foundation, else ship in brick, because it is not advisable to set a wooden structure down in the ground.

Question—Wouldn't you advise building a cheap stave silo rather than not have any, even if you did not put a roof on it?

Mr. Stiles—Why, no, I don't know as I would. I would rather wait a few years and then put up a good one. It is not absolutely essential that a man should have a silo, because there are a good many men who haven't them today. If you put up a cheap silo, may be your ensilage will keep all right for one or two years, but your neighbors will come to you and they will look at this silo and you won't be proud of it, and then about the third year you will spoil a whole lot of feed and your neighbors will say "I want nothing more to do with a silo."

Mr. Robinson—Do you anchor your silo to the foundation?

Mr. Stiles—Yes, where the upper part is wood. It is not absolutely necessary, but it will hold it there more safely. It is better to stay it to the other building. If you anchor it to the bottom, and not stay the top, the wind is apt to rock it a little.

Mr. Johnson—On this question of going into the ground in the way that Mr. Stiles speaks of, that is, on a sidehill where you can have an opening that will not be above a man's head, as I understand it the fumes of carbonic acid gas that are found in the bottom of the silo are death to man, and when they get up to a man's mouth, it is dangerous for him to be in there. It is all right to make your silos to go down five or six feet and then have an opening and leave it open. We had trouble in one of my silos, it came very near being the end of me. I had to be helped out when I was pretty nearly used up. You can build down five or six feet and be sure of having good, pure air, and there is no doubt but that part of the silo is the cheapest part to build, and the best silage.

Question—Would you advise using brick where you could get them for from five to seven dollars a thousand?

Mr. Stiles—Well, if I couldn't get stone for less, or couldn't get gravel pretty cheap for grout work, then the brick would be all right. It all depends upon what the relative cost of these various materials is. Masons can lay brick faster than stone, and I think at that price it would be all right to use brick, unless stone are very cheap.

Mr. Convey—I know a silo, the walls of which are over a foot thick, made out of concrete. The man I speak of built in light iron hooks welded together, but we can take light wrought iron, or even galvanized iron will answer the purpose; when you are so situated that you can get gravel, that is the cheapest way to do it.

# SILAGE.

C. P. GOODRICH, Ft. Atkinson, Wis.

Silage can be made of any forage plants if put in a good silo while in a green, succulent state. Silage has a greater feeding value than the same forage would have if cured by drying in the field, because it is more digestible. There is more to be gained by siloing corn than by siloing crops that have finer stems that can be more quickly dried. There is usually great loss in field curing the fodder part of corn. It takes so much time that much of the leaves and finer parts become weather-beaten by rain and wind and are wasted and also much of the leaves are frequently, when very dry, crumbled up and lost by handling. In drying, the thick stalks become woody and indigestible and are not eaten by stock. The ears of corn, if well matured before frost, cure well in the field, but even these are better if put in the silo at the right stage, because they remain soft and are more easily masticated and better digested than if dried. Of the fodder part of the corn, one-half of it is usually lost and wasted in the curing and feeding.

It takes less labor to make silage of a corn crop than it does to prepare it for feeding in any other way. Stock do better if they have some dry feed and some succulent feed. From what I have said, it will be seen that corn is the best crop of which to make silage, and hay of some kind should be used for the dry fodder. Corn silage is very palatable. All kinds of stock eat it greedily and prefer it to almost everything else. They eat it all up and do not leave even the thick butts of the stalks.

## Value of Silage to Dairymen and Stock Raisers.

Silage is especially valuable to the dairyman who is carrying on winter dairying, increasing the flow of milk very much over what can be obtained by dry feed alone.

Fattening cattle make more rapid gains when a part of their ration is silage.

Young cattle and sheep are better and more cheaply fed when a part of their winter feed is silage. Some men have fed it to their horses and report good results.

Silage is not only a good winter feed, but there is nothing better to feed dairy cows to help out the pasture in times of drought and short feed. In fact, silage is so palatable and cows like it so well, that they will eat some of it with great relish, even when they have good pasture.

There are many dairymen who feed silage as a part of the daily ration every day in the year and they are some of the most successful dairymen in the country. Silage seems to be a sort of appetizer. It is not only easily digested, but it appears to aid in the digestion of other foods fed in connection with it. Animals consume more food when part of the daily ration is silage and therefore make faster gains, if beef animals, and give more milk if dairy cows.

No better milk is produced in the country than that of many herds that are fed silage every day in the year. Mr. H. B. Gurler, of De Kalb, Ill., who milks two hundred or more cows, and many other dairymen who produce certified milk, every quart of which is sold for twelve cents, feed their cows silage every day as part of their ration. Many of the best dairymen in the country who are making dairying the most profitable, do not pasture at all, but feed silage in connection with other feeds the year around.

There are many men who denounce silage and say it is not fit for cows to eat, and claim that it injures the cows and injures the milk and other dairy products. But they are men who know nothing about it; they have never had a good silo, or if they have had one, have never had good silage, because of not putting in the forage in a proper manner, or in a proper condition.

It is true that rotten or damaged silage is not fit for cows to eat and will injuriously affect the flavor of the milk. The same is true of any moldy, musty or damaged feed if given to cows.

### How to Fill the Silo.

A silo may be filled quickly or slowly, as circumstances permit, with equally good results. It may be filled in one day and be all right. In that case, the silage will settle a great deal in a few days, and if the silo is to be anywhere near full, more must be put in, filling it to the very top.

If the silo is filled slowly, taking several days to complete the job, it will settle as the work progresses and be all right, provided that there is not a stop in the filling of more than one or two days at a time. If there is, the silage will begin to mould on top, and that injures it.

### Kind of Corn Best for Silage.

The kind of corn to raise for silage is that which will produce the greatest amount and value of food per acre, taking both ears and fodder, that will be reasonably sure to sufficiently mature in the locality where it is raised.

The stage of maturity at which it is best to put it in the silo is when the corn contains the most feeding value, taking the whole plant,—stalks, leaves and ears. At that time the corn is beginning to glaze, if it is flint corn, or dent, if it is dent corn; the lower leaves are beginning to turn yellow or white, and on some of the very earliest ears the husks are turning white. If the corn is more immature than this, the silage will be quite sour, will lack the nutriment it would have at a later stage, and not be as valuable feed. If the corn is too ripe and dry, it will heat up very hot, will mould and be damaged.

In case the filling cannot be done until the corn is too ripe and dry, this can be remedied to a great extent by having it so arranged that water can be sprayed onto it as it goes up the carrier when filling the silo, enough to supply the needed moisture.

### How to Prevent Spoiling of Silage.

Various ways have been tried of covering the silage after the silo was filled, to prevent the spoiling of the silage on top, but it has been found that nothing is better or less expensive than to put on water enough to thoroughly wet the top of the silage and have enough so that it will run down between the silage and the sides of the silo.

Many avoid all loss from damage on top by beginning to feed immediately after filling, thus giving it no time to damage. The feeding should always be done from the top, taking about two inches from the entire top each day. If the feeding is done too slowly and part of the surface is left exposed to the air for two or three or more days, then the stock will have partially damaged silage all the time.

The feeding of silage very materially reduces the cost of producing dairy products, because fewer acres of land are required to keep a given number of cows, less work and expense is needed to prepare cows for feeding, and last, but by no means least, cows can be made to produce much more during the year by having them fresh in the fall and feeding silage in winter.

## DISCUSSION.

Mr. Jacobs—How about putting sweet corn in the silo? In our section there is quite a good deal of sweet corn raised for canning, and it is quite a question whether we can use this corn after they have broken the ears off and carried them to the canning factory, or if we shall use the stalk some other way.

Mr. Goodrich—I have tried putting Stowell's Evergreen sweet corn in the silo, but the ears were on. I raised it for the purpose of putting it in the silo, and it made a more sour ensilage than other corn and I didn't like it as well. If I were you, I would rather keep your stalks to feed out in the fall. Sweet corn will not dry out very quickly.

Mr. Jacobs—But we have more than we can feed in the fall. They are doing this in a commercial way, you understand.

Mr. Goodrich—Then I would put it in the silo.

Mr. Foster—Wouldn't you prefer to have that corn riper than regular field corn, in order to keep the silage from souring?

Mr. Goodrich—No, I would have it about the same stage, when the leaves begin to die at the bottom.

Question—Wouldn't it be well where they have this sweet corn and the ears have been taken off, to mix it with other corn that had not been robbed before putting it in the silo?

Mr. Goodrich—I have had no experience in that line, so the rest of you can guess just as well as I can.

Mr. Jacobs—Isn't it true that silage immediately after being put into the silo is not as palatable to the cows as it is after going through the fermentation?

Mr. Goodrich—Oh! I have found this to be true. I have been feeding my cows corn run through the feed cutter and fresh from the field. Then I have commenced feeding it from the silo, and in a very few days they preferred the silage to the fresh cut corn fodder; and the cows will do that, I think, every time. Only last summer I saw a man take some silage out of a silo and offer it to his cows, and at the same time one of the boys brought a handful of corn from the field just to see which the cows liked the better, and every one of those cows preferred the silage to the fresh corn from the field.

Mr. Scribner—Does not the ensilage have to go through that heating process before it is fit to use? We always open one silo and go to feeding immediately after we get one filled, and we never get good results until we get down where it is nice and solid.

Mr. Jacobs—That is my experience, and there is a time when my cows will not eat it until it becomes ensilage.

Mr. Johnson—That is my experience exactly. We have two silos; and we commence feeding immediately. It is like making pickles, the woman will say that the pickles are not ripe for a few days and then pretty soon they are ready to eat.

Mr. Thurston—Mr. H. B. Gurler recently told me that he was going to build enough silos so that he could feed old silage the year around, because he said whenever he changed from the old to the new silage his cows dropped in milk to a large extent.

Mr. Goodrich—I want to make a statement here. I took a cow census in Fond du Lac county to get material to use at the meeting of the Dairymen's association. I took the statements of forty-eight patrons of a creamery, and took them right along as I found them, made no selections at all. Of that forty-eight there were six who had silos, forty-two did not. When I got the returns from the creamery, I found that the average returns from butter from those who fed silage was $52.52 per cow per year. The average returns for butter of the forty-two who did not feed silage was $34.00 per cow per year—$18.52 less. The net profit over the cost of feeding to the six who fed silage was $21.02, and of those who did not feed silage it was $4.00. Those who fed silage got, in gross receipts, 54 per cent. more than those who did not feed it; and, in net profits above the cost of feed, the men who fed silage got more than 500 per cent. more than those who did not feed it. Now, does that prove anything? Does that prove that silage helps the dairyman any? It looks like it to me—but I won't say, you may tell. Now, it is not possible that it makes all of that difference! What is it that makes the difference? I will tell what I think makes some of it. It is because the men who build silos are more progressive men, are higher up in their calling—excuse me gentlemen, I have got to say something that may hurt the feelings of some of you—they know more. Oh, I will let you down a little from that. I don't want to say that every man who has not built a silo don't know much, but those men who have are farther on their way up to the top. The highest receipts per cow of those who had silos were $67.79, the lowest $43.00. Of those who did not have silos, the highest was $57.89, so he was way above some of the men who built silos. One man who did not have a silo, got only $22.00 per year from his cows. His returns lacked $10.17 of paying for the feed of his cow. Now, do you suppose a silo could help that man out? Not much; it wouldn't have done him any good, because he wouldn't have had a good silo; he wouldn't have put the corn in right; he would have left his cows out in cold days, as he does now; but the good farmer, it does help him ten dollars on a cow, as these figures prove, and as other observations that I have made prove.

Mr. Thompson—Judging from my experience, if I had to get along without a silo, I wouldn't try to keep dairy cows.

Question—How about clover for silage?

Mr. Goodrich—Clover makes good silage; but we must have some dry fodder to feed with the silage and generally you can make hay or field-cured clover a great deal easier than you can corn, so we better make the corn into silage and the clover into hay, although clover makes good silage if it is properly put in.

Mr. Nordman—In central Wisconsin, sometimes we get caught by the frost when we are filling the silo. If the corn is mature, what is the difference in feeding value of silage that has been cut before and after a frost?

Mr. Goodrich—I don't think there is a great deal of difference. I think a comparison between corn cut one day and put in before the frost, and that which was cut a day or two afterwards would not show a great deal of difference.

Mr. Nordman—Many people believe that if a field is caught by the frost like that that the silage will be worthless, but my experience has been that there was not enough difference to be noticeable. As far as I can see, the cattle eat it and do as well with it, providing always that the corn is matured.

A Member—My corn was all caught by the frost. As soon as the frost was over, I commenced to fill the silo and took about a week to fill it. I have been using ensilage for twelve years, and never had any better than I had this winter from that corn.

# GARDEN TRUCK.

**DELBERT UTTER, Caldwell, Wis.**

It is hardly necessary to say that the chief object of every truck farmer is to make money. It is not a business to go into, but to grow into. The truck farmer who grows a great variety of garden crops must acquire more knowledge and give his crops more care and attention than does the general farmer who only grows the staple crops. Much depends upon location, which should be near a good market, or where the best of shipping facilities can be secured.

Picking Berries on Farm of Delbert Utter.

### Ideal Soil for Truck Growing.

The ideal truck soil is a mellow, sandy loam and nearly level, for cultivation is thus made more effective and there is less loss from surface washing during heavy rains, not only of fertility, but from washing out and covering of plants with soil. A liberal amount of fertility must be applied, a portion of which should be stable manure, as it is of the utmost importance that the soil be supplied with a large amount of organic matter to keep it in the proper mechanical condition.

When the land is cropped every year, as it must be in growing vegetables, conditions are different than when a rotation is followed, as in general farming, therefore humus must be applied, both by the use of stable manure and by growing cover crops. When possible, it is best to grow for this purpose leguminous crops which will add fertility to the soil by taking nitrogen from the air. Decomposition is more rapid in sandy soils than in heavier soils, therefore there is a greater loss of soil fertility unless we keep a crop growing continually during the growing season.

### Preparation of the Soil.

The gardener can afford and must give his soil better preparation than the farmer. On account of the heavy application of manure, he must cultivate to thoroughly incorporate this manure with the soil; this is best done by harrowing and disking before plowing.

By deep plowing, harrowing, leveling and firming, it is put in the best of condition for germination of seeds and for the best plant growth. This careful preparation and condition of the soil is particularly necessary for the growing of early vegetables, as in early spring nitrification goes on very slowly in the soil and every means should be taken to allow the heat and air to penetrate to the roots of the plants. Heat, air, and moisture cause chemical changes to take place and convert the nitrogen that is in the organic matter of the soil into nitrate, which is soluble plant food.

The early crops may be forwarded by the use of a light dressing of nitrate of soda at time of planting and again at time of first cultivation. Seed should be carefully sown and planted, using the best seeders and planters. No rule can be given as to depth, for different soil and weather conditions must be taken into consideration, but it is safe to say, plant at such depth as will secure certain germination.

Ready for Market.

### Seeds.

To procure the best seeds which are grown, the gardener should be informed as to who grows the best seed, as well as who are the most reliable dealers, then procure the best, buying, if possible, of the grower. All seeds cannot be grown in the same latitude, but those the gardener is able to produce himself should be selected and cared for in the best possible manner.

### Cultivation

The cultivation should be frequent and thorough, beginning as soon as possible after planting; shallow work after plants have made much root growth should be insisted upon, using attachment on cultivator to adjust it to the proper depth, which should not exceed two inches. The tools used should be the best of their kind and should be kept bright and sharp. A file should be carried to the field and cultivator and hoes sharpened often. The necessary tools are: steel plow, disk and fine tooth harrow, leveler, roller, horse weeder and cultivator, wheel and hand hoes, adjustable marker, seeder, planter, rakes, spade and spading fork.

The gardener who makes the most money is the one who can get the nearest to the consumer catering to the very best trade, furnishing a continuous supply of the best at a season when prices are best.

### Some of the Most Profitable Garden Crops.

While growing a variety, it is well to make a specialty of such crops as are best adapted to our soil and are in best demand in our markets. The perishable vegetables and those that are known as delicacies, are the ones that are the most profitable, if they can be delivered in perfect condition.

Asparagus is a popular vegetable and has a long season. It thrives best in sandy loam or well-drained muck soil, one which has been cultivated and manured heavily the previous year is preferred. At no period of its growth should it lack for liberal manuring.

Furrows should be opened five feet apart and eight inches deep with plow and cleaning out to even depth with spade. The plants, which should be one year old, should be set with roots spread out in a natural position and eighteen inches apart in the row. Be careful to cover the crown not more than two inches at first, gradually filling the furrows as the shoots advance in growth. Thorough, clean culture is essential at all times. As crowns of plants are several inches below surface, disking and harrowing is practical after stalks are cut in fall and before growth begins in early spring. After the principal stalk growth is over and before the seed matures, mow off and remove tops and burn them. Maturing seed is said to be the most exhaustive effort of plant life and volunteer seedlings as bad as weeds. Not until the third year should marketing be allowed. Care must be taken in cutting; run the knife below surface and avoid injury to the other shoots. Palmetto and Argenteuil will prove to be the best for almost any market.

### Sweet Corn.

Sweet corn, if grown so as to furnish a continuous supply from early to late, selected and delivered fresh to regular customers, is a very profitable crop. No crop depends more upon good seed. It is not only necessary that seed will germinate, but must have vitality enough to cause it to grow strong and vigorous from start to finish. Mammoth white corn is the best early, followed by Premo, Chicago Market, Early Crosby, Stabler's Early, Early and Late Evergreen.

### Tomatoes and Muskmelons.

Tomatoes and muskmelons should be started in hotbeds. Seeds of the former should be sown about the first of March in boxes or flats, which may be made three or four inches deep and of such width and length as may be the most convenient to handle, the boxes to be placed on soil in hotbeds, which should be filled so that the boxes will come close to glass. As soon as plants have made the second leaves, they are transplanted to other boxes and planted two inches apart.

Two more transplantings should be made, the last time in cold frames and well hardened off before setting in field. The soil should have been plowed and harrowed sometime before, and then disked and harrowed at time of planting. Set in checks six feet apart each way. Avoid planting on land that has had tomatoes or potatoes on for several years, as there is danger of infection from blight.

Muskmelons may be planted the first of May in inverted sods in a fresh-made hotbed. The manure for this hotbed may be of the coarsest kind that is in a fermented condition, and if it is a foot deep after being well tramped it will be sufficient. Sods cut from sandy or loamy soil, six inches square and three inches thick, are laid evenly in the hotbed. Plant five or six seeds in each sod and thin to three or four when plants are well established. Keep temperature at about ninety, or even higher, for the first week and then gradually lower it until the fourth week, when, if well grown, covers may be removed and plants hardened to outdoor conditions. Soak seeds thoroughly and transplant in the field when weather is well settled and nights are warm.

### Insecticides and Germicides.

There are many forms of insecticides and germicides offered for sale, but plain Paris green used as a spray at the rate of one pound to two hundred gallons of water will be found efficient as a poison for potato bugs, cabbage worms, and all eating vermin.

Tobacco dust and land plaster are used with more or less success for striped bugs on vine crops. Bordeaux Mixture is a preventive for many forms of blight, but must be applied before blight has attacked the plants to any considerable extent.

It is well to grow the varieties that are the least liable to blight and then give the very best culture possible, as it is the weak growing plants that are the first affected.

## DISCUSSION.

Question—How do you make a hotbed?

Mr. Utter—If the soil is well drained, so there is no danger of the water standing in the pit, I make a pit a foot deep and a little wider and longer than my bed. I make a movable frame, and a good size is six feet by twelve. We make this frame eighteen inches high on the back side and twelve inches on the front, with sloping ends. We use two by two's as rafters where the sash will join, and we use a two by four in each corner, to nail sides and ends to, and to make it strong, letting them extend down five or six inches below frame. We fill the pit with manure, which should be in a heating condition. When it is heated so it is steaming, as it usually is in the pile in early spring, it will be in fit condition for use. It is put into this pit, four or five inches at a time, and tramped down, continuing until we have sixteen inches in depth. Then the frame is placed and we fill in about six inches more. We put the sash on, and at the same time bank up around on the outside with the manure or soil, to keep the heat in and the cold out. We let it remain in that way five or six days, opening the sash during the hottest part of the day, and then tramp down until surface is firm and level, then fill in with the soil to the depth of five inches. We use soil prepared the year before, the best garden soil, mixed with well rotted manure and turned several times during the summer. When we put it in the hotbeds, we use a sieve, one with a half inch mesh. If we sow directly into the soil, we fill in four or five inches. The safest way is to use flats, for the reason that when you begin transplanting you can carry them to the barn, or anywhere you want to, while it is yet too cold for transplanting in the open air.

Question—Isn't there an objection to taking manure right from the manure pile to the hotbed?

Mr. Utter—Not usually, as our manure piles are usually in a heating condition, but it is necessary to allow this first rank heat to pass off.

A Member—My experience is when you take manure from the manure pile and put it right into the hotbed, that mildew often occurs. I let it stand for two or three days in a box, then turn it over two or three days afterwards, and again, even the third time; that makes the manure in better condition. Also, to ensure the strength of it, it is a good thing to take oak leaves and put a layer of manure and a layer of oak leaves.

Mr. Utter—That is a very good plan, but we use coarse manure and do not need the leaves.

Mr. Hill—Do you find some varieties of muskmelons more subject to blight than others?

Mr. Utter—I am not very well posted on that, but think they are. I have only planted one variety since blight has been prevalent.

Question—Have you seen anything of the asparagus blight in Wisconsin?

Mr. Utter—I have had it. I was forced to plow up my Conover's Colossal, but the Palmetto has withstood its ravages.

Question—Did you ever try fire instead of manure?

Mr. Utter—I never have.

Question—I have a neighbor who does that altogether. He regulates the heat, has whatever he wants, and when the sun is hot, he lets the fire go out.

Mr. Utter—I think if I were going to use fire, I would make small, cheap, narrow greenhouses. These small greenhouses are taking the place of hotbeds with most of the market gardeners.

Mr. Johnson—I noticed in Lincoln Park, Chicago, they have plants growing all the year around with the use of steam heat, and have pipes back and forward, and the same heat that heats the building heats these beds and keeps the soil warm. I have thought oftentimes that if a man had accommodations of that kind, it would be a big advantage to him over anything else to warm up the soil.

Mr. Bradley—What is the variety of muskmelon that you say you now plant?

Mr. Utter—I have grown a variety of local origin, which is called the Thomas Hybrid. It is a hybrid grown as a cross of the Emerald Gem and the Surprise, and selected until it has become a type.

Mr. Bradley—After your plants are up in the hotbeds, do you leave the sash on continually?

Mr. Utter—I sow the seeds in these flats and after they are sown I cover them with cotton cloth, or gunny sacks, and water on top of those. That keeps the seeds from washing out, and also keeps soil from drying. As soon as the seeds begin to sprout, we raise those up two or three inches off the soil and take them off after a day or two, but shade the glass through the heat of the day. We remove the sash an inch or more when the sun shines bright, to give them air. If you don't, the temperature will run up to about 120 degrees and about ninety degrees is about the limit for the day. The temperature should not go below fifty-five at night.

Question—What do you consider one of the best varieties of tomatoes?

Mr. Utter—For early, where there is no danger of blight, the Dwarf Champion. Early Stone is one of the best for a late variety. I have tried many of the new varieties, but few of them have proved superior to the older varieties.

A Member—I find the Picture Rock to be a very good variety, a Wisconsin propagated tomato. I think that Childs has seed at present.

Question—Is the Dwarf Champion subject to rot?

Mr. Utter—No more than any other variety, but in growing tomatoes, I think in each locality we should try to get those that we know have done well in that locality. They are affected by soil and other local conditions as much, or perhaps more than any other vegetable.

The Chairman—Would you pinch back or trellis?

Mr. Utter—In a farmer's garden, the trellis plan is an ideal method, but for market gardening it would not be practical. On sandy soil, it would not be necessary for either purpose.

Question—Where do you get your seed?

Mr. Utter—I buy my seed corn from a grower that makes a specialty of growing seed corn, one of the best in the United States, an eastern grower. The western seeds grow well, but the product grown from such seed is not of as good quality as that grown from eastern seed.

Mr. Thompson—I took the first premium on corn grown in Wisconsin.

Mr. Utter—This is not west. I am speaking of Nebraska and Iowa seed, and out there they get corn with a larger kernel and thicker hull. I buy my seeds from such seedsmen or growers as I think offer the best seed without considering the price. Any of the leading seedsmen are fair dealers, and mean to be honest. The trouble is, seeds are contracted for at too low a price, the growers cannot afford to grow seeds and care for them as they should.

The Chairman—Mr. Utter is the most particular man I know of in regard to all these things. He has the very best trade in Milwaukee, because he pays particular attention to the quality and to the manner of growing.

Mr. Hill—What do you think about the farmer saving his own garden seed after the family has taken what it wants?

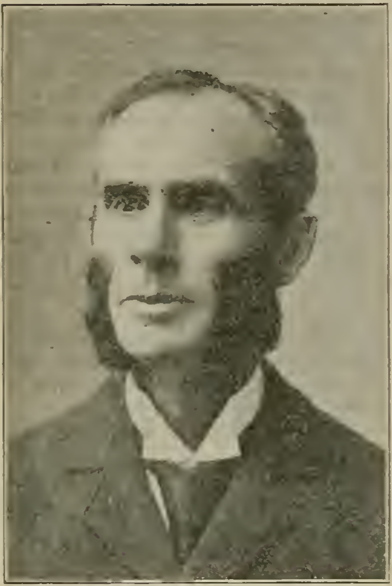
Mr. Utter—I think it would be very poor policy.

Mr. Foster—Don't you think that the farmer will resemble what is left after he gets through?

Mr. Utter—He will be liable to.

# FORAGE CROPS.

Prof. THOMAS SHAW, St. Paul, Minn.



Prof. Shaw.

Now, farmers, I want to talk to you in a simple, plain, old-fashioned way about your own and our own concerns, and I want you to talk back just the same way, and I am going to talk about forage crops.

There may be some difference of opinion as to what the term "forage crops" means. I attempted to write a book on forage crops once, and I consulted the dictionary for the definition, but it did not satisfy me, although it was the Standard Dictionary, so I formed a definition for myself, and this is my definition, crops other than grasses that are grown for pasture, but I am going to use the term in a little wider sense this afternoon and talk about crops that are not only grown for pasture, but will be good to some extent for being cured and fed in the winter season, so I use the term in the sense of fodders as well as in the sense of pastures.

### Winter Rye.

I am going to speak first about a common plant, a plant that I think has never been taken at its full value in the northwest, or probably in any part of the United States—I refer to winter rye. I believe that there is no plant that is sown for the purpose of providing pasture, outside of grasses pure and simple, that will furnish more pasture for the labor and the expense involved in sowing it than rye, and especially for those who live upon sandy land where their grasses are inclined to grow a little shyly.

One reason I have for thinking so much of winter rye is because of the fact that it can be grown as a catch crop. Of course you know what I mean by that, a crop that is grown during some part of the season when it does not preclude the possibility of growing another crop on the same soil. That is one of the reasons why I think so much of winter rye, but another reason is because of the large amount of grazing which it produces. It may be sown in August if there is enough moisture in the ground to cause it to grow, and it will provide pasture in the late fall and it will pay in the spring before the blue grass comes, before clover, before even the new grass, Russian Brome. The rye will be up as soon as growth begins, and it will produce a good growth until something else comes along in place of the rye. Now, if it is not wanted for pasture, one of the fine things about it is that it may be turned under, buried in the soil and will very much increase the power of the soil to hold moisture, in addition to the large amount of valuable plant food on hand for the crops that are to come after. In other words, it is a plant which, although it does not add directly to the fertility of the soil by what it draws out of the air, yet it does draw out fertility from the subsoil, because of its great power to gather plant food, it puts it in the soil for the next crop that will be grown off it.

### Sorghum.

The next from the list of forage crops to which I will refer is sorghum. I would like to know how many grow sorghum in this part of the country, either for pasture or for soiling food, or fodder to feed in the winter. I see that some of us have tried it. I am free to acknowledge that when I came to the United States in the year 1893, I do not think I had ever seen sorghum growing; I did not know how it grew, and I don't know how long I was in the state of Minnesota before I could find a man who could tell me anything about it, so what little knowledge I have gained about sorghum has been gained almost entirely from experiments in growing and pasturing and feeding it on the farm connected with the university of Minnesota.

Now, I don't know that I ought to speak particularly highly about the value of sorghum as a possible crop, but I do know this, that if a man has a flock of sheep and his pastures are gone in the summer season when the summer is hot, if he has a good crop of sorghum coming on on which he can turn the sheep, that sorghum will go a long way toward carrying him over that part of the year when it is difficult to get good pasture. I do not say I would recommend keeping a flock of sheep entirely on sorghum if it can be avoided, but at least it will be a great help.

One of the good things about it as a pasture plant is that it commences to grow up again immediately after it is eaten down, and persists in growing until cold weather comes in. I will not say that it will furnish more pasture than any other pasture plant grown in the summer season, but it will furnish a great deal of pasture and one of the fine things about it is that it can be put in late in the season, after a crop of rye has been grown, if you like, there is plenty of time to prepare the land and to sow sorghum, either for pasture or for soiling food, to feed in the fall, or for fodder to feed at a later period.

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### DISCUSSION.

Question—After the rye has been grown to grain?

Prof. Shaw—No, but after the rye has been grown for pasture

Mr. Goodrich—How much sorghum seed do you sow for pasture?

Prof. Shaw—About a bushel of seed for pasture, from that to a bushel and a quarter, will make a stand that is amply thick. I would sow it broadcast for pasture. I think I would sow it in rows in growing it for fodder. Now, remember there is a sort of a trick in growing sorghum to grow it without great labor and to grow it in good form, and that trick is simply this: begin preparing the ground, plow the ground in the fall if you can, and then in the spring, harrow it at intervals, or work it with some kind of a shallow cultivation two or three times before the time comes to sow the sorghum; by that time the sorghum will keep ahead of the weeds; otherwise, the danger is very great that the weeds will get ahead of the sorghum, as it grows very slowly at first, and if the weeds get the start, you will not have much of a crop of sorghum.

Question—Is there any danger of poisoning the cattle?

Prof. Shaw—There is danger of poisoning the cattle in some places, but I question whether that danger exists to any great extent in the state of Wisconsin. I am inclined to think that is caused to some extent by a particular condition of the weather; when the weather is exceedingly dry and the plants begin to become dwarfed in the grain, they seem to go through some sort of chemical transformation which causes the sorghum to contain a certain amount of something, I don't know what, and I wish I could meet with somebody who does know what it is, but it is something that causes death to cattle. So that I am not here before you to recommend you to grow sorghum for the purpose of pasturing your cows upon it.

Mr. Goodrich—I never heard of any cattle dying in Wisconsin or Minnesota from the first sowing of sorghum. It is in Kansas and the southern states where the first crop has been cut off and the second crop is saved.

Prof. Shaw—There are cases where the first crop has caused death in those hotter states, but it is generally the second crop. Now, I have called your attention to this crop, because I think it a question of some importance that we should begin to grow sorghum for the purpose, more particularly, of feeding cattle in the fall of the year. We know that our grasses oftentimes become so coarse and so dry that they do not serve the purpose as we would like them to do, and we have to give our cattle some supplemental food. I know that the ground may be taken that corn will furnish us the feed that can be fed at that time, but it is not correct to say that corn will furnish feed that will be relished as much by the cattle at that season of the year as sorghum, and it is not correct to say that corn will furnish as much feed per acre as sorghum for the purpose that I now speak of, so that I would like to leave the thought with you that it is worth while to experiment in growing sorghum, not on a very large scale at first, until you have gained more experience in growing it, but to grow some sorghum, test its value as feed, for the purpose of feeding to cattle at that season of the year more particularly.

In growing it for that purpose, it may be grown in three different ways, it may be sown broadcast, I would prefer putting it in with a seed drill, because it puts the seed in to a more uniform depth, and at the depth that you want it put in, and in clay land it does not want to go down so far as in other land. On the loam soils of Minnesota, we put it in about an inch and a half. As soon as we begin to see the first points coming up through the ground, we take one of those fine-toothed harrows and turn them as far backwards as they will go and drag that over the surface of the ground, it destroys the weeds that have started to grow, and before another crop of weeds gets started the sorghum will be up and taking care of itself. If you go in that way, of course it grows quite quickly. You can cut it with a field mower, or a reaper. Let it lie a couple of days on the ground in heaps, and it may rain and rain and that is all the hurt it will do if you are going to feed the sorghum before the winter comes. I do not know any plant that will take so little damage by rain as sorghum. One of the bad things about sorghum is that it is not a very nice job to pitch it on the wagon, not very easy to handle.

Mr. Goodrich—Why don't you use the binder and bind it?

Prof. Shaw—You can, if you make small sheaves, but if the weather should prove very moist, it is very apt to heat a little bit under the band and hurt.

Question—How high does this grow?

Prof. Shaw—That depends somewhat on the soil and the season. It will generally grow from four to five feet high. Something depends too upon the thickness; of course, the thicker it is, the less tall it grows. Now, when it is fed to stock in that way, it can be fed on grass pasture, so much drawn out each day and scattered over the grass pasture, or in the shed; it may be drawn and put in the racks in the barn, but the point I want to impress upon you particularly is the exceeding palatability of that kind of food. The stock like it, and will eat it up substantially clean. But, remember, that the frost will injure it just as seriously and quickly as it will corn.

Mr. Goodrich—Is there any danger of it flavoring the milk?

Prof. Shaw—No, I never heard that objection.

Mr. Goodrich—Does it make good silage?

Prof. Shaw—It does make silage, but I don't think I would recommend it for silage where corn can be grown on the farm. Our experience has been that corn makes better silage, sorghum seems to become a little more acid than corn.

Question—How would it do to mix in the silo?

Prof. Shaw—It can be mixed, but I don't think there would be any advantage in that.

Question—What time do you plant sorghum?

Prof. Shaw—I would plant it just about the time that you get through planting corn. As soon as the corn is planted go to work and put the sorghum in.

Mr. Jacobs—Will it be fit to feed as soon as the corn?

Prof. Shaw—Just about as soon as the corn. You have always noticed that when development is very much arrested at the start, I don't care whether it is in the sorghum plant, in the calf or the boy, the development is never the same afterwards, hence it is exceedingly important not to plant too early and that when it begins to grow, and makes a good, vigorous start, it doesn't make much difference what happens to it afterwards.

Mr. Thurston—On this question of poisoning with sorghum, let me say the Experiment Station of Nebraska has separated it and found it to be prussic acid, and that it is mostly found in a suspended growth.

Question—Is there any trouble about sorghum lodging?

Prof. Shaw—Sometimes a storm will come down and thin down a field of corn, so it will be a good deal thinner, but such a storm will not throw down sorghum.

Mr. Convey—Mine went down, but we raise sorghum seven and eight feet high.

Mr. Jacobs—We sow ours in rows six inches apart and use about forty pounds of seed to the acre.

Mr. Convey—I used all the way to sixty pounds. It does not make good silage.

Mr. Scott—Mr. Story, my neighbor, has sorghum eleven feet high. It was drilled in.

Prof. Shaw—Gentlemen, gentlemen, do not try how high you can get your sorghum, try how low you can get it, and how fine you can get it. Of course it makes a difference whether you sow it broadcast or in rows, and also the kind of sorghum.

Mr. Johnson—We raise sorghum down with us and we get all the way from four hundred and fifty to five hundred gallons to the acre. It is a good thing for the boys and girls, and I see more money in it for that than for anything else. Any farmer who will raise a quarter of an acre will get more money out of it than any quarter of an acre he has on his farm, if he will turn it into syrup, and make fodder of what is left, and then what is left of that after the syrup is extracted will be good for sandy roads. We are careful never to let the stock in where we have cut the sorghum off; we know that is dangerous. Is there any variety you would recommend?

Prof. Shaw—I think the Early Amber is best for our conditions. You can commence feeding sorghum when it gets high enough to cut, but I do not think the feeding value is anything like as good at that stage as when the sorghum gets up near maturity. It is like rape, the nearer we let rape get its growth, the more food we will get from it to the acre. The question has been raised over here about sorghum as feed for hogs. If you grow sorghum on the broadcast plan, and grow it quickly, in order to get that crop light to be cut with the mower it is not very good for hogs; but if you grow it in rows about three feet apart and you get large stalks, it is a splendid feed for the hogs if they are allowed to feed upon it during a large part of the winter. Of course there should be some other feed along with it.

Now, to come back to the question raised over here about rye tainting milk. Rye will taint milk if the cows are allowed to pasture on it all day, especially after it gets considerable growth, but if the cows are turned onto it for a few hours in the morning after they are milked and kept on some other kind of pasture the rest of the day, I do not think that will follow.

Question—How do you store sorghum for winter use?

Prof. Shaw—Now, you come to a point where I feel, gentlemen, like recommending that you do not store very much of it, although there are some persons who store a great deal of it and feed it regularly, right through the winter, but I think corn will answer the purpose better in the winter season, and especially in the spring, in a climate which is subject to the changes we meet, because cold seems to have an effect on the saccharine matter in sorghum which is not so good, and so it is not so good for winter as autumn feed. The place I think that sorghum ought to fill on our farms is to furnish feed from about the first of September until the ground freezes up, or perhaps about a month after that, and then the corn comes along, but of course it can be cut and bound in sheaves and shocked up like corn and fed through the winter in that way. It furnishes more succulence than any of the crops that we have during the early fall and winter, and I am satisfied that the largest amount of food that can be grown from an acre of land can be grown from sorghum.

Question—Do you raise your seed or buy it?

Prof. Shaw—We purchase it. It can easily be raised, but it is not easily kept. It moulds very easily.

Question—Is it expensive?

Prof. Shaw—Yes, it is, for the reason that only few persons engage in the work of growing the seed. It would not be expensive if there was more grown and called for, I think we paid nearly two dollars a bushel.

A Member—I bought it for one dollar this year.

Question—Does the firm of L. L. May grow their own seed, or are they jobbers?

Prof. Shaw—I don't think they grow their own seed on their own farms. I presume, like other seedsmen, they get part of their seeds from farmers.

Question—Do you feed sorghum while in a frosted condition to cattle?

Prof. Shaw—It is not so good after a hard frost comes; although I never heard of any injury resulting from that condition.

Mr. Convey—If you wished to save seed, how would you grow it for seed?

Prof. Shaw—I would grow the crop in hills, the same as that gentlemen grows it to make syrup. That will produce excellent seed. You can grow a crop of seed and a crop of syrup at the same time.

Mr. Johnson—Cut off the tops the same as grain and hang them up. Take a pole or anything in your wagon house, and hang them the same as you would broom tops; then you clip out the seeds over the edge of a barrel.

Mr. Convey—That is pretty slow work, we want bushels of it.

Mr. Johnson—You can thresh a bushel of it in that way in ten or fifteen minutes.

Mr. Jacobs—Would you grow sorghum and feed it in preference to ensilage?

Prof. Shaw—I prefer to feed it in

the fall, I think that is the best use to put it to, and I am only advocating growing it for feeding it at that time of the year, if you plant about the first of June, you can feed it by the end of August, as soon as you get it cut, the frost will not harm it after that, but if the frost strikes it before you get it cut, it will take serious injury.

A Member—Eighty-five to ninety days after seeding it is the best for feeding.

Prof. Shaw—It grows very fast if the ground is properly prepared.

Mr. Convey—In this country they clean up new land each year and some seasons it is too late for corn.

Prof. Shaw—Do not lose sight of the fact that sorghum will grow far better in a dry season than corn. Now, because I say that, do not give up growing corn, and grow nothing but sorghum, that will be a mistake, but try to set aside a certain amount of land for sorghum every year, so that if a dry year strikes you and hurts your corn crop, you are going to have a certain amount of sorghum to help you out. It will stand any amount of wet if the ground does not become too saturated.

Mr. Thompson—As I happen to come from the section of Canada where Professor Shaw has left monuments of his energy and thought, I wish that the Professor would tell us something about growing rape as food for sheep. There is nothing that has been more responsible in bringing in money in the vicinity of Guelph than this very matter. I know there is no man in this country more capable of educating the farmers on the practical growing of crops, as well as on feeding them than Prof. Shaw.

Prof. Shaw—When one hears testimony such as comes from my brother, it makes him feel that he has builded better than he knows. Before discussing that subject, I want to tell you something that shows the immense progress that has been made with reference to the rape plant. A seedsman of Minneapolis told me not long ago that when the first bulletin was issued from the Ontario College on the subject of rape, I think in the year 1890, there was not five hundred pounds of rape seed sold in the United States in order to grow forage crops. J. E. Northrup told me the other day that fifteen carloads of rape seed were handled by his own house this present year, and he did not expect that it would go around. It is simply marvelous, the extent to which that crop has been grown in this country.

Now, in regard to the rape plant, as you know of course, it is entirely a pasture plant. It is not good to cure for the winter, it is not good to put in the silo, it is simply good for growing pasture, and the best use that can be made of it is to let the animals pasture it off, although it can be used as a soiling food. Now, in regard to growing rape, it will grow on any kind of land that is good, but the best land probably for growing it is those mucky swamps. I think I would say that very light sands and very stiff clay, on those kinds of land it will not do so well, but I don't know that I ever saw land so rich that it would not grow rape, and you can pile on manure and the more manure you have the more rape you seem to get. So if you want to grow a very big crop, even though you have very good land, I would recommend some attention to be given to the enrichment of the land. In Canada, we sowed it in the row and cultivated the crop about the same as other crops, but since coming west, I have rather dropped the idea of growing in rows and cultivating it, for the reason that our land over here is so much better as a rule, especially on the prairies, than our land in Ontario, that we get plenty of rape by simply sowing it broadcast. The land ought to be made as clean as possible; the very same steps that would be taken to clean land for sorghum would do to clean land for sowing a crop of rape. You can sow it any time after the opening of spring, after the ground gets dry, but when I say that, I do not want to be understood as saying there is no danger of it being killed by frost in the spring; for I do remember one instance in which it was killed, I think two years ago, after it germinated, but I don't think that would happen more than one year in ten or twenty. In Canada we never sowed it until about the first of June; we didn't think that it could be grown successfully sown early, but we find we can sow it any time from the time the ground becomes dry in the spring and right on as long as there is enough moisture in the ground, so late that it has about sixty to seventy-five days to grow, so that you see that any time you have got sixty to seventy-five days ahead you can sow it with the expectation that you are going to get a full crop. You can sow it every week right on, until about the middle of July, where your ground has been properly prepared, and it will produce an enormous amount of food. You may turn from ten to twenty sheep on an acre of rape, according to the growth you get, and when they get through with that acre they will be fat, and I do not know of any other kind of pasture ground that you grow that will produce results like that. Professor Carlyle will tell you from their experiment that it is splendid pasture for swine.

Question—Could that be sown in winter grain or barley after the grain is cut?

Prof. Shaw—Yes, it might. I know of some men in the state of Minnesota, I have one in my mind in particular, who, I think in the year 1894, wrote a letter to me asking that very question. I remember replying that I thought he could, but I had had no experience in doing it. He went to work and tried it, and he told afterwards, on an Institute platform, that on his seventy acres of land on which he grew grain, that he had pastured 2,000 lambs, and he had a full crop of grain in the bargain. He sowed about one to one and a half pounds of seed to the acre, with grain, mixing the seed with the grain and putting it in with the drill.

A Member—I tried it in barley last spring, and I will never do it again because the summer was rather wet and the rape came up all right, and I had a big time getting that barley dry.

Prof. Shaw—Gentlemen, you can grow it in barley all right, if you do it right. It is certainly all right in the state of Minnesota, and in the Dakotas, either north or south, but I question a little if it would be just the right thing here. Your soil is stiffer than prairie soil. While it is perfectly correct to bury rape seed to the depth of two and a half inches in prairie soil, I do not think it ought to be buried to a depth of more than an inch in this soil, so I would not feel justified in advising you to mix your rape with the grain if you put it in as deep as you put the grain; but it can be sown at the same time and harrowed in. It can be sown in winter grain in the spring, but you should harrow it in in that case.

A Member—I have experimented just a little sowing it with oats, and every bit of grain I have this year will be sown that way.

Mr. Goodrich—Usually it goes all right, but won't there be some risk of the rape coming up and a good many of the stalks getting ahead of the grain?

Prof. Shaw—You can avoid that. I would not recommend trying to do it when you grow barley, especially on black soil, but wait a couple of weeks after sowing the barley and sow the rape, and then harrow your land. A good time to sow the rape is when the barley is beginning to show, coming through the soil, and it will be a good thing to harrow it then. If you can't do it on account of the ground being wet, wait a little longer and sow the rape and use any kind of instrument that will do the work without spoiling your barley.

Mr. Goodrich—This soil does not bake here as it does in the southern part of the state.

Question—How about sowing flax?

Prof. Shaw—I wouldn't recommend sowing in flax, because it is almost sure to get ahead of the flax and make trouble while the flax is being harvested.

A Member—It is a good thing to put in corn, the last cultivation, where you intend to put it in the silo.

Prof. Shaw—Yes, it does all right in the corn if you sow it at the last cultivation, but there are times when corn grows so tassely that it makes too much shade and the rape doesn't amount to much, but anyway the seed doesn't cost much, and it will mature after the corn is taken off if the weather is right.

Mr. Bradley—Did you ever hear of any trouble in feeding pigs on a rape pasture?

Prof. Shaw—The only trouble I ever heard of was this, that on some of the farms in Iowa where there was an immense amount of rain last summer, they kept their pigs on rape pasture where they were running through the rape, and I suppose feeding all the time, in that wet, dripping food, and it seemed to produce blisters on top of the ear, but in the dry season I don't think that would happen.

Mr. Bradley—We have heard a lot of that this winter in Institutes, and it has been made an objection to feeding pigs on rape, but I have insisted that it was not the rape.

Mr. Convey—We had pigs that had no rape that had just that form of water blisters on their skin.

Prof. Carlyle—We had pigs running in the fall grass and the skin became blistered. We thought it was simply the wet weather.

Mr. Bradley—One man up here said his pigs all died from canker sore mouth, and he laid that to feeding on rape. It always happens that way, if we are feeding some new crop and something happens, everything is laid to that particular crop.

Mr. Johnson—Down in our country rape is sown inevery way, though most of them sow it with grain in the last cultivation and have good success. We do not believe in cultivating corn till the ears are all done growing. We cultivate corn and get it clean and leave it till the corn has its ear formed, and before it begins to get dented. If you can't get your corn cleaned early in the season and keep it clean, you had better stay out of the business; and if you have your cornfield clean you haven't anything to do but sow rape, get four or five pounds and sow; it costs only twenty-five cents a pound. Then let your sheep run in the pasture, and they will live in there until that corn is cut and the cutting of the corn won't pasture much off, and immediately after the corn is cut off, you have the whole field to run over. With us, in sowing with grain, a great many get caught in the way this man did by having it all grown up together to spoil and become a rotten mass that can't be handled with any kind of a machine.

Question—Is there any danger from bloat in pasturing sheep on rape?

Prof. Shaw—In this country there is some danger, but no more danger from bloat I think in pasturing sheep on rape than in pasturing sheep on clover. In Ontario there is more danger; I think the difference is because of the difference in climate. I think there is more moisture in the rape over there and that makes it more dangerous, and sometimes, even here when we first put the sheep in on rape, or when they have been allowed to go on some other field where there isn't much pasture, and go back again on rape when it is wet, then there is some trouble liable to arise from pasturing rape. Then there is sometimes difficulty in pasturing after the rape freezes hard and begins to melt again. It seems to disturb the digestion of the animal.

I have been asked about the Soy bean. I am inclined to be very optimistic in regard to the agriculture of this state and believe there are lots of things we can do and shall do. I believe that Soy beans are going to be grown right across the center of Wisconsin from side to side and push up even to northern Wisconsin, but we have got to acclimate the seed somewhat before we can accomplish that. There are some varieties that will mature the seed right now. The Early Dwarf will do it; the Medium Dwarf will mature some of its seed, but not all of it. I think there is going to be a considerable future for growing the Soy bean here, perhaps not so much as there would be did you not have so rich a clover country, because the Soy bean is a soil enricher, the same as clover, and you do not need that near so much as the farms in South Dakota and North Dakota, but the Soy bean will accomplish a good mission, even for central Wisconsin after awhile, particularly if your clover should fail or some other crop fails and you want to enrich your soil. The Soy bean is a hot weather plant, like sorghum, you can prepare the land after your other crop has failed ad grow a crop of Soy beans on it, and you have enriched the land as much as if you had grown a crop of clover on it. Of course the Soy beans can be utilized for various purposes, I think probably the best use to make of them in this part of the country, especially where you grow them as soil enrichers, putting them in the same as other beans, is to let the pigs harvest them, and so you get a fair crop of feed that is well adapted for the pigs and the enrichment will be brought to the soil at the same time.

Mr. Bradley—Has any one up your way tried putting Soy beans into the silo with corn?

Prof. Shaw—It has been tried, but we have not been able to get the right kind of seed. I think in those cases the seed was put in with a drill, the two being planted at the same time, the beans coming up along in the corn row, but we are going to get Soy beans acclimatized, and probably going to get larger varieties than we have, but I believe that after awhile we are going to grow Soy beans.

Question—Does the soil have to be inoculated with bacteria in order to do it?

Prof. Shaw—Sometimes it has, and sometimes it has not. Generally speaking, you don't need to inoculate the soil for any of those plants, but on drier soils, sometimes it does need to be inoculated. The same is substantially true of alfalfa, but where you find hardwood timber growing successfully, as it does up here, you can be absolutely sure of being able to grow alfalfa without inoculating the soil.

Now, farmers, there is one more crop I would like to talk to you about. I take it for granted that you who are keeping cows are buying a good deal of bran for your cows, and I want to recommend that it is a good thing to grow our own bran, because bran is getting beyond our reach, at least let us grow our own feed on our farms to the greatest extent that we possibly can and be independent of the fluctuating markets. Now, do not understand me that I am recommending that you do not buy any purchased feeds outside of what you grow on your own farms, but I am advocating that you try to the greatest possible extent to grow all you use on your farms, as far as you can, upon your own farms, and try to grow them in such a way that you will need to buy just as little as possible. I am not talking now to those who are carrying on the feeding of cattle or sheep in a large way, but simply the ordinary operations of the every day farmer. Now, I want to ask, have any of you practiced to some extent the growing of some of the coarse varieties of spring wheat, such as the Wild Goose, and oats along with speltz?

A Member—Here is one.

Prof. Shaw—How did you succeed?

The Member—Finely. I grew it with my oats, about a peck to three bushels, or two and a half bushels.

Prof. Shaw—I have had very little testimony from anybody in central Wisconsin as to whether speltz will grow anything like as good here as it does in northern Dakota. There it is getting to be a great crop to grow as feed for the live stock. We tried it in Ontario, and it didn't do very well, but on the supposition that speltz will grow in good form in this country, we recommend growing a mixture of that kind of wheat, and I think the Wild Goose is the best kind.

Mr. Scott—I tried speltz with oats one year and it was not a success. Some of the neighbors tried it and the yield was very small.

A Member—My neighbor tried speltz and he had over fifty bushels to the acre.

Prof. Shaw—That is something that you will have to work out for yourselves. I simply dropped the idea, if you can't get wheat and speltz and oats, then get wheat and oats, we know those will grow together, and it is a fact that more of a crop will be grown with a mixed crop than a single crop.

Mr. Scott—What is the objection to putting in a few peas with the oats?

Prof. Shaw—In this country it would be all right, probably; in Minnesota the peas would be lost, unless you made about three parts of the crop peas and one part oats, and you wouldn't see the peas, I suppose for the reason that the prairie soil is much better adapted to the growth of oats than of peas. In Canada we would put in a bushel of each and get a good crop of both, but we can't do it in Minnesota.

Prof. Carlyle—We have the same conditions right here as we had in Canada.

Mr. McMillan—I wish to relate my experience in growing wheat and oats together and feeding them. For the last ten years I don't think I have lost more than six or eight horses. In the thirty-five years that I have been in business out in this country, I have lost probably a hundred and thirty horses. Now I find that feeding my horses with wheat and oats that they are not subject to colic. They are in better condition always than when I used to feed them clear oats or corn and oats, and I grow from three to five thousand bushels of oats a year. The wheat seems to have the same effect upon them as if you gave them a bran mash once a week, and they get it right along and I think it is good, strong feed, and they do very well on it.

A Member—I sowed wheat with my oats last summer, I think not over two pecks to the acre with a bushel of oats, and my horses have done better than they ever did before.

Prof. Shaw—You see you gentlemen can feed bran that you grow yourselves, and that is just what I want you farmers to do, grow your own bran and grind it yourselves.

Mr. Hubbard—We tried speltz in our neighborhood and liked it very much, but I can't see the advantage of growing that, it seems to me that there is a whole lot of shuck on it. This man spoke of feeding wheat with his oats. He would get the same results feeding bran with his oats.

Prof. Shaw—I am not sure, gentlemen, that there would be any advantage in growing speltz, but do not lose sight of this principle in feeding live stock, that feeding a variety of feeds is nearly always better than feeding one; so, gentlemen, when you grow two grains together, you will get more than you will when you grow one, and better still if you grow three.

Question—Is speltz a proper substitute for bran?

Prof. Shaw—No, it is more like barley. The thought I want to bring out is this. Now, how many of you have put in a little flax seed along with that mixture? If you have done that, you have made yourself independent of the man that sells bran and you have made yourself independent of the man who furnishes oil cake, because you grow your oil cake along with the other grain; you have a balanced ration yourself on your own farm, and if you feed that along with a certain amount of clover hay, of which I understand you have plenty in this country, you have the very best kind of ration.

Mr. Scott—In sections where we have a great deal of corn, this ration will not take the place of bran in balancing up a corn ration.

Prof. Shaw—Not alone, no; but if you can feed good clover hay for fodder and have corn, and this other mixture, you will have a pretty good balanced ration for feeding any kind of cattle or sheep.

Question—Can you tell us a little something about gluten feed?

Prof. Shaw—I am not very well posted in regard to those things. Professor Carlyle can tell you better about that.

Prof. Carlyle—I don't know so much about gluten feed; we have fed but a few tons of it. We have fed a great deal of gluten meal, and that we think very highly of; we consider it superior to oats and to bran, but we cannot get it any more, for it is not being made. It is being made up with corn husks, and I don't know what all, and making what they call gluten feed out of it, and we don't like that so well. We haven't fed enough to speak authoritatively on it.

Mr. Rietbrock—In feeding this mixture of oats and wheat, do you feed it whole or ground?

Prof. Shaw—I would prefer it ground for cattle always and for swine. Whether that is best for horses, would depend on your other feed.

Now, let me just add two or three thoughts by way of caution in growing those mixed feeds. I have told you a few things about growing them; there are a great many things I cannot tell you and no man can tell you, unless it be your neighbor who has the same kind of land. I can't tell you how much of one kind of grain to sow, and how much of another kind, that depends entirely on your land. What I might tell a farmer to do in the state of Minnesota might be entirely wrong here. Do not lose sight of the fact that you have to work out these problems for yourselves; try certain proportions of those grains on your own farms, keep working at it until you get those proportions that will answer your purposes best, but whatever you do, do try to grow your own feed.

Prof. Carlyle—There was a question over here about the effect of feeding rape to milking cows. We have been experimenting for three years at the Experiment Station on that point, and we find that under certain conditions, we can feed it without affecting the milk. It must, however, be very mature; we cannot feed rape under about ninety days from seeding, nor must we feed it in large quantities. We have grown twenty-six tons of rape to the acre, cutting it green, and hauling it into the barn for our cows, and we have fed as high as sixty pounds of very mature rape to the cows, and the creamery men there have found no fault with it, but you have to be very careful not to let the cows pasture on it, because it is worse than rye in that respect. There is another point about the sorghum. We have been experimenting extensively with that; we have been sowing it for four years in various ways, we have sown from twenty pounds an acre up to eighty pounds to the acre, and we have settled on from seventy-five to eighty pounds per acre as being the best amount to sow for the growing of green feed for our cows, and for hay to be fed off in the fall. When the stalks were not a bit larger than my little finger last year, they would average about eight feet high, and we grew thirty-four tons and a fraction to the acre of green feed—weighed it. We have no feed that we have grown for soiling crops to feed our cows that will at all compare with sorghum, because we actually weighed and tested, and we know what it will do. We know of no kind of feed that will keep the cows up in milk flow so well. We tried different ways of curing; we cut it and shocked it, and we came to the conclusion that the best way is to cut with a mower; let it lie for a day or two, on the morning after, rake it up, or, if it is a very heavy crop, you can get a fork full as fast as you can pick it off the ground; cock it up in large cocks, as large as you would cock hay, and leave it there until you get ready to feed it, even if it is until snow flies. We left it in that condition and fed our cows last year and they enjoyed it immensely. It is an exceedingly good milk food. It is good for sheep, and there is nothing in the world so good for the brood sow, and all young pigs. We used to throw a fork full over into the yards and inside of twenty minutes every bit of that would be eaten, except the fibre, and nothing seems to keep our hogs in such condition as sorghum feed. We tried to see whether we could preserve it in stacks; we put it up in small stacks from a quarter of a ton up to three-quarters, and anything over three-quarters of a ton will not keep, as we found out after it had been stacked up two weeks. Then we found that keeping it after becoming frozen hard it became bitter and the stock did not relish it after that time; that is, after it had frozen and thawed. So feed it up while it is green, and from that time on until it freezes up before winter. We have sowed with grain drill and with the grain drill with two spouts closed up and one running, and with every spout running, and we came to the conclusion that we got the best feed for the cows with every spout running.

Prof. Shaw—Did you find it awkward handling?

Prof. Carlyle—No, the boys were so good natured at seeing such a tremendous yield and because we didn't have to go very far for a load. It doesn't pitch as well as timothy hay, it is awkward to handle.

Prof. Shaw—Did you give it any cultivation after being sown?

Prof. Carlyle—We harrowed it with our harrow every three or four days, but there is no advantage in sowing early. We sowed some along in May and some adjoining it three weeks later, and the last lot we sowed was ready to cut before the first lot. The first lot was stunted and never grew to be good. It holds a great deal of succulence and it is great feed. We prefer to cut it up, run it through the feed cutter, that is the nicest way to feed it.

Mr. Imrie—Did you feed any grain while you were feeding that to brood sows?

Prof. Carlyle—We fed some shorts and some whey, getting it from the creamery, but I would not depend on it altogether for brood sows just as a laxative.

Prof. Shaw—You say you cut it but a great many farmers think it will answer their purpose perfectly well to strew it over the pasture and the cattle will eat it up clean.

Mr. Convey—And they will eat it in the manger without cutting. It won't grow well in cold weather, but when it gets started in warm weather it will come right along; you can almost see it grow. We feed it direct from the field until it comes time to cut it. We like it best both for green feed and for hay when the seed is beginning to form, before it has taken much nourishment from the plant.

Adjourned to 7:30 p. m.

## EVENING SESSION.

The Institute met at 7:30 P. M. Supt. McKERROW in the chair. Music, Orchestra; Music, Ladies' Quartette.

The following committee on resolutions was appointed by the chairman: W. C. Bradley, Hudson; Frederick Rietbrock, Milwaukee; Thomas Convey, Ridgeway.

## THE VALUE OF THE TRAINED HAND.

**Mrs. NELLIE KEDZIE JONES, Berea, Ky.**

Mrs. Kedzie-Jones.

The world holds value to mean one of two things: It may be the amount of material which can be bought in exchange, or it may be the property which renders something useful to the world.

Studying the trained hand from the first standpoint, we have much with which to fortify the position that it is valuable, because no one will dispute the fact that much of the money of the world is spent for the product of the trained hand. To begin with the necessities of life, we find that only the trained and educated hand can prepare the cotton which comes to our market so that it shall make acceptable dress goods. We find that only the trained hand can take that dress goods, and cut, fit and make into garments for us to wear. The cunning workmanship which goes into our shoes, the deft handiwork on the well prepared skins for our wraps; even the shaping of our gloves and the fashioning of our bonnets, is all the result of training somebody's hands to do well the piece of work desired.

We find on our table evidences of trained hands all the way along, from the making of our wheat into flour to the making of the daintiest morsels put upon the table to tempt the palate. We find only the trained hand is capable of making the sweets for our table, out of the juice of the cane, the beet, the corn or the maple tree. No one would think of putting an untrained man in the work of a flour mill, and I am told that at one of the large sugar factories, the man who tests the boiling syrup to find the moment for turning off the sugar, is the man who receives the highest wages. Our chemist can tell the exact point, but he is not deft enough to find it in the evaporating pan.

Our meat grows upon the western prairies, but only the lithe wristed cow-boy can throw the lasso which starts the ox on his way to our market; it takes a practiced hand to strike the deadening blow, while only the trained hand can cut the veins at just the right spot to drain the body of the larger part of the blood.

After the food is brought to our homes, every housewife who has had to struggle through the hard days of bitter experience, or who has trained a raw Swede or Irish girl to know the ways of an American household, knows there is need of much training for the hands that shall prepare that food so it will become a material which will build up the human body into the most perfect dwelling for the Holy Spirit, "which Temple ye are."

In all these occupations of life, it is training that counts, and the product of the trained hand means to us better clothing, better food, year by year, simply and solely because of the training which makes better work possible with the materials at hand.

If we question about our habitation, the merest shell of a house today must have for its construction the trained hand at the foundation stonework, the trained hand to put up the timbers, and a man who is "capable" to finish the outside of the house. While inside, no one of us would presume to take up the plasterer's trowel, or the decorator's brush and more than we would today feel that we were capable of properly hanging the paper in the parlor or of setting the plate glass windows. The trained hand again must be in evidence or the work is not considered well done.

These are the necessities of life. The money paid out in every instance I have mentioned, is more than half given for skilled labor which puts the material in place. The cotton or wool or silk costs little for the garment, the making of that material into wearing apparel is what costs. Timber and plaster and paper cost but little, the work of the trained hand takes the money.

If then this training is of value as evidenced by the amount of money it can demand for the necessities of life, what shall we say of the amount that is given for the work of the hand which supplies the comforts and the luxuries?

The comforts of a well appointed home show, in every direction, training which has been carried on through long years of patient practice. The carpet-maker's skill, the window curtain manufacturer's long practice, the deft hand of the furniture maker are all brought into constant play and are capable of bringing us constant delight, because of the training which has given them the power to give us comfort and beauty along with the bare materials which we put into their hands.

The prices we pay for all these comforts of home are largely paid because of the training of the man who does the work day after day, and who does it because we are not well trained enough to do it for ourselves.

Value, then, of the trained hand comes to us also through ability to bring to its owner money which we gladly pay for the privilege of possessing the product of the trained hand.

### The Trained Hand Develops the Beautiful in Life.

This for every day comforts; what shall we say of the dainty beauties that come into our lives, seldom perhaps, but often enough to give us an appreciation of what the trained hand may accomplish.

There is no end to the beauty of the world, which brings money because that beauty is the work of trained hands. The Brussels lace which keeps its makers year after year in underground cellars, spending their lives upon one or two pieces of elaborate working out of fancies born of their own sense of beauty, but only worked out because of the training of the hand, gives us some slight appreciation of the amount of wealth that can be put into a piece of work and when we pay $10,000.00 for one lace flounce, we are paying, not for the thread which was worked into the intricate design, not for the pattern, which cost, in comparison, but a few pence, but we are paying for the training which made that hand capable of working out that pattern with the delicate threads.

We take for a moment the hand which makes the picture on the wall to which all eyes turn in admiration. And while we talk of values, can we measure the value of a canvas six feet by ten, though it bring in the open market $135,000.00, or does that amount of money show the slightest appreciation of the real value to the world of the canvas which has had upon it the brush of a Michael Angelo?

Can we question the value of the trained hand that brings to our ears the melody of the piano? All the world delights in the music sent out from a set of wires by the trained hand of a Paderewski. The training which he has put into his fingers means ability to make us understand his ideas of music.

Do you say that I am talking now of genius, not of training? Then I say to you that the genius of the artist burns in the soul of many a man and woman who has never had the opportunity to train the hand, and so lacks the power to show the world the ideas that flame within him.

The genius of a Blind Tom is perhaps more than the genius of a Paderewski; the one who was untutored and untrained; the other had the best training that the world could give his fingers, and I leave you to judge of the power the two men have had upon the world.

## Is the Trained Hand Useful in the World?

On the other side of the question, as to whether the trained hand is useful in the world, I ask you in all seriousness have any of these things mentioned been useful, have they had a definite utility? Who of us would let them slip out of the world if we could? Certainly, if the mass of people are willing to spend their money for the product of the trained hand, it is of value, for the world today counts of little worth if it will not pay its money for it.

Shall it be only the individual trained hand which the world cares to own? There was a time when the training of the brain for any community meant the training of one or two people; the priest, the monk, later, the minister of the town, had about all the brain training that was given. It has not been many years since a serious question arose in the family, if there happened to be a boy who was frail of body, or who was supposed to be of less than the average intelligence, that question always hinged upon the fact that the boy must, in some way be able to earn his own living, and if he were below the average of other boys it might be well to send him to college and train his brain. Every community had one or two members so trained. After a time it came to be thought wise to give all the young people of the community a little brain training because it was soon found that the man who had the most of such training carried more weight in various communities and made himself of greater value because of his training, whether for a specific purpose or for the general value of education.

Slowly the thought has grown up among us that every one is better off for some brain training; that the people live happier lives; that they make more successful communities; that the standard of living is raised; that the power of the nation is greater if the individual has better brains.

We have come to a new era in education where we are looking to see whether the training of the hand will not do quite as much toward helping the world to be wiser and stronger and better as has the general training of the brain; and as one school after another has taken up the matter of teaching every boy and girl to use the hands along with the teaching them to use the brains, it has invariably been the case that the mass of students have done better work when deftness of the hand has been required along with quickness of the brain.

### Usefulness of the Trained Hand.

Let us consider the value of the trained hand as regards its usefulness in the world outside of its money value; usefulness to the possessor. William I. Crane says, "Nature has given us two channels of expression; the tongue and the hand." Unfortuately civilization has undertrained the hand and overtrained the tongue, as every day bears witness.

While we have been neglecting the general training of the hand, we have still been using this as our best mode of expression, best because it gives greater variety and allows us to give to the people about us the ideas which have grown up in our thinking brain, and have become so strong that we really desire to share them with our fellow beings.

We have but one means of expression with the tongue, that is language. We have with the hand, music, painting, sculpture, architecture, landscape gardening and mechanic arts. We give expression with the voice, as well as with the hand, to the musical ideas which we evolve, but the other five hold us entirely dependent upon the hand for their expression to our fellow men.

While we have neglected the general training of the hand among the people, still we have learned to count as great attainments ability to do that which demands strong work, and we hold, in the world, that the expression of man's hand has meant more in the progress of civilization than has any expression of tongue or voice. In all direction of strong growth we find that the men who think strongest, who have been most powerful to reach their fellow men, have reached them, not only through the voice, but through pen and printing press, and there has come again necessity for the deft hand. Ideas are of value only as they are worked out. The board upon the water gives man the means of transportation, but the great ocean liners, while working out the one idea of a floating dwelling, have shown the product of the trained hands, until we find ourselves transported with the comforts of life all ver the watery world The brains gave the idea—the hands worked that idea into usefulness.

Look upon the buildings that characterize the great cities of the world; men and women who have evolved the strongest thought have put their thoughts into buildings, on canvas, into musical scores, or have sent out books which have taught people, and have sent from the originator the great ideas which have developed along the lines of his special thought for the edification of the world in many directions.

If then the hand takes five parts, and the tongue but one, can there be any question to the world of the value of hand training? Is not the better use of the hand a help toward making one individual in the world understand another? Is it not a help toward disseminating the great ideas which have been evolved by the strong brains? Of course the thought comes that this special training of which we are speaking is not the generally accepted term, hand training, but hand training in its strongest, best meaning is simply and solely cultivating deftness of hand, that the ideas worked out by the brain may be communicated to the people within reach of the products of the hand.

There is an extremely fallible idea that manual training is drudgery, that it means learning a trade and nothing else, that it means making oneself into a machine. This is all wrong. Manual training means comparatively just what brain training means. Brain training means ability to think; hand training means ability to do, and no one can think best, unless he can work out his thought; no one can work best, unless he has brain power to think out what he wishes to do.

When the minister was the only man who had been trained to use his brain in logical thinking, he was looked up to by the whole community, and was asked to do the thinking out of knotty problems for the whole town. Today, every man and woman in free America is an independent thinker. The world has grown in its conception of the use of brains. There is room yet for more growth because we see day after day, more or less people who have need for more thinking and better thinking along the lines of their own individual affairs. We hope to remedy this lack of thought in our communities by better training in our schools; and we talk much of the fact that when we have taught a child to think logically and well we have done the best work for him possible, because he is then able to accomplish anything he wills in the study line.

## Great Need of Trained Hands.

Today we find the pupils growing up in our schools and starting out into the world with their brains trained to activity, but in many cases we find their hands deficient in ability to carry out the thoughts which their quickened brains are ready to express if only there were deft fingers. We are in the same condition that we were when the ministers did the thinking, helplessly dependent upon a few people to do the work of comfortable living, day by day.

Do you ask, then, if we are all to be so trained that we can do anything? And where will be the specialists?

In reply I answer while we have all learned to read our own Bibles, and to do our own thinking, we value our ministers more than ever. While we all know more of hygienic living than was known to the olden time, we have quite as much use for the doctors, and value them as they were never valued before.

It is not special trades, nor special work, for which manual training prepares the owner of the hands, but deftness and ability to use the hand in proportion to the use of the brain. I believe the day will come when the man who can use his brains, and who can only think, will be considered but half educated, just as we today feel that the man who can only use his hands is but half trained. Ruskin says, "There can be no happy labor without thoughts, and there can be no healthy thought without labor." The two must go together, and Ruskin's ideas have been found sound when our strongest men came to the point where brain work was hardest, and need for grave, earnest thought was most apparent. When the "grand old man of England" needed to do his strongest thinking, he shouldered his axe, and, marching into the woods, chopped trees, that his hand work might stimulate his brain to stronger action. When one of the best ministers of this country needed to think out his most earnest sermons he wandered through the fields, picking up rocks and digging into the underground caves, until, covered with the grime of the earth, and filled with the beauty and the glory of the forms which centuries ago were made below the surface of mother earth, his thought was stimulated, and the sermons he delivered to his people carried with them, not the grime, but the glory which came through his conception of God the Father, through the works of God, put upon the earth for his children.

When a woman writer, who has perhaps given to this country the strongest novel of the century, washed her dishes and moulded her bread between pages, she brought a practical realization of the science of living which meant more than brain work, more than hand work, it meant both together, and therefore it meant a strong personality which showed to the reader of "Uncle Tom's Cabin" a womanly heart which could stimulate a strong brain and conceive the great things of life.

The Trained Hand in the Apiary.

The men who have given the world something the world wanted to remember, have been the men and women who were no half-way people, they were whole workers, workers with the heart, workers with head, workers with hand.

Murillo, Sir Christopher Wren, Rogers, Beethoven, Edison, have all been great men, but not only because their hands were deft to show the world the thoughts that arose within them.

When the story of the life of one of the most accomplished of hand workers, William Morris, was told, his biographer said of him: "He was a man who could influence the housekeeping of half the world, who could paint beautiful pictures, could write sublime verse, compose music, speak four languages; he was a weaver, a blacksmith, a wood-carver, a painter, a dyer and a printer; best of all, he could help those about him to lead more useful lives, because he could help them do more and better work for themselves and for each other. He could do as well as think. It is well to call him Master."

### Education One-Sided.

If the principles we have held for many years that it is good to train all children along brain work lines holds good for the work which gives us one-fifth of the expression of the world, why should it not be well to train the children somewhat in the lines which give us four-fifths of the expression of the world? Have we been a little one-sided in this matter of education?

We hold that every child should be taught to read that he may inform himself of the thoughts of others. We hold also that he should be taught a little hand work—to write,—that he may send his own thoughts into the world in permanent form. If the great mass of humanity, reached as it is through the voice and the tongue, can listen to the training of one part of the body, as we all listen to each other, how much more could it gain if the hands which gave four-fifths of the expression of the world were to be trained as thoroughly as we have, in the last few years, trained the brain of our young people?

We say, in order to understand the thoughts of others, we must learn to think. I say, in order to understand the works of others, we must learn to work. And as we can only expect to appreciate the great thoughts, not think them, because of our stimulated brain, so we can understand great work better if our own hands are deft and ready to do some of the many kinds of work the world demands.

The kindergarten is the ideal beginning of school, and as we have worked the kindergarten idea until we have certain proficiency in it (not that I hold it has reached perfection, but it is growing in that direction) we should put the kindergarten ideas all the way along through our schools. Older people have to carry kindergarten work through their daily lives, year after year; why should it be withheld during the restless years of growth, and why haven't we appreciated the fact that the growing bodies need exercise and growing hands need training, just as much as do developing brains?

Kindergarten, in its purity, means keeping the little hands busy, while the little brains work, and if in our intermediate grade schools we could keep the hands busy, we should find no difficulty in managing the brain work, because each child would have so many ways of expressing his ideas through his hands, that ideas of work would leave no room for the mischief which frequently brings a child into disrepute with his teachers and parents. "Satan finds mischief still for idle hands to do," is not a bygone saying. It is as true today as in olden times, and the best way to combat Satan in the mischief of the little hands, is to fill those hands so full of helpful, pleasant work that there will be no room for mischief. As we grow older, you will each agree with me that every day is filled not only with ideas our brains evolve, but with working out those ideas for home, for church, for community, for nation; and the working out means deftness of hand as well as quickness of brain. Why should the college girl be given only training which shall make her ready of tongue, when most of her life must need busy, ready hands? The woman who is most ready to do, and who knows how to do, is the woman who is most valued, wherever she is placed.

### Illustrations of Value of Manual Training.

Less than a month ago I heard a man who commanded a regiment of soldiers in the Cuban war, say that he was thoroughly converted to the manual training of boys in school. His reason for making this statement was because one of the companies in his regiment was largely composed of boys from a town where a manual training school was established ten years ago. He said the manual training company under marching orders was always ready before either of the other companies of the regiment. Wherever they were at night, these boys were ready with deft hands to cut logs, to prepare beds, to put up tents, build fires, and to cook meals with so much more readiness of hands than any of the other companies, that he asked them how many of them had ever been in a manual training school. He found that about seven-eighths of the company had been in the school, and had spent about five hours a week in teaching their hands deftness, while about thirty hours a week had been used in training their brains. He immediately said, "Give me more companies who knew how to use their hands."

Four boys who went out from another manual training school were each given a set of pocket files when they joined the army. During the whole campaign in Cuba these four boys escaped sentry duty, and were allowed to go to their tents and sleep whenever there was sleep for anybody, simply because with their pocket files and their deft hands they were soon found to be able to repair the guns and keep them in order. Their deftness of hand served them in good purpose, and while the man who had only his brains trained marched back and forth in the drizzly night, his brother, whose trained brains could direct deft hands, could sleep and prepare himself for tomorrow's battle.

We are told that during the war the men from the colleges and the learned professions suffered most in times of hardship. They had no power to use their hands until trained by dire necessity to take hold of the rough end of soldier life. We are also told that they were quicker to take hold of this rough end than were the men who were simply diggers in the ditches. The trained brain helped largely toward teaching the hands to work, and to work to good advantage, but a little training of the hand would have helped these men to avoid much hardship, many times to have escaped disease, and fewer of them would have gone into soldiers' graves, because they would have been ready in many ways to prepare for themselves such comforts as were within reach.

### Trained Brains and Trained Hands Must Work Together.

The adjustment between mind and matter must be accomplished by the work of the hand. Possessors of ideas whose owners have no ability to work them out, seldom accomplish any good in the world. They are like the woman who wishes to throw a stone, but who shuts her eyes and screams when she raises her hand. If she hits the object it is an accident.

A definite idea, with a trained hand to work it out, means somewhere a piece of good work. If the brain be trained so well that it will evolve ideas, and the hand be made so deft that it will accomplish the purpose those ideas demand, we may expect men and women whose lives will mean more to the world individually, and who therefore will make stronger communities.

Have I demonstrated the value of the trained hand? If we pay our money for its products, if we find it of value to the individual, is it not worth having?

The world has recognized the fact that God gave to his children certain ability to use his gifts and we can only do our very best to learn to use those gifts wisely.

We have been 1800 years studying the lesson of Christian brotherhood, and learning to make our lives mean something of good to those about us. We have found that when we have become most able we can be of most help to the world. We believe that by training the brains of our children we make them stronger, better men and women, who can do more for themselves and more for others because of their ability to think.

We look up to the man or woman

who is always ready, in every emergency, not only to think, but to do, and urge our young people to emulate the example of those who have been able to think great thoughts—to accomplish great deeds.

When we learn to so train all hands that they can work out the ideas evolved, then we shall have found the true value of the trained hand in th world.

Music, solo, Mrs. McCullough.

Superintendent McKerrow made the announcement that, after having a governor at the Closing Farmers' Institute for the last nine years, Gov. La Follette would be unable to be present this evening and called upon Mr. B. F. McMillan, of McMillan, Wis., to address the audience. That gentleman entertained the large audience for a few minutes with a number of good anecdotes and some reminiscences, closing with the following words of wisdom.

Mr. McMillan—You have heard today some of the claims made for this part of the state. I want to say to you that I believe it is the best climate in the world to come into and make a home in. You say that the winters are cold. Did you ever spend a winter in southern Illinois? I have. We had four seasons in one day; here we only have four seasons in a year. We have plenty of snow, which is a help to the farmer. Now, there is one thing I want to urge upon the farmer in this country, and that is to preserve a wood lot. There have been altogether too many trees destroyed already in this country, and our farmers should make calculations for saving from ten to fifteen acres for a wood lot, because it takes at least ten to fifteen acres of second growth timber to keep a family in wood for one year, and then you have got to maintain it, and you have got to take good care and use it judiciously. Not only is it necessary from this point of view, but ten acres of a wood lot on a farm affords a good deal of protection form the winds which have been so disastrous in Iowa and Minnesota and the Dakotas. If we will save a growth of ten or fifteen acres on every hundred or a hundred and twenty acres of land, we will save ourselves from a lot of that wind and be enabled to do business in the winter, which we are not now able to do at all times.

I am very glad to have met you all, but I think you have found out that I am not like Longfellow. who can take a piece of worthless paper and write upon it a poem and it is worth $5,000. That is genius. Pierpont Morgan can take a piece of paper and write a few words upon it and it is worth a million dollars. That is capital. The mechanic can take a pound of steel and make watch springs with it, and it is worth $800.00. That is science. The merchant can take a piece of goods worth a dollar and sell it for two dollars. That is business. The merchant who says that he has got better goods than the other fellow, that is gall; and I think, ladies and gentlemen, that I have shown a great deal of gall in undertaking to stand here before you and talk.

Adjourned till 9 o'clock a. m. next day.

## MORNING SESSION.

The Institute met at 9 o'clock A. M., Thursday, March 19, 1903. Mr. D. B. FOSTER in the chair. Prayer by Rev. Mr. McKinnon.

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# EXPERIENCE WITH OAT SMUT.

W. C. BRADLEY, Hudson, Wis.

Smut in grain, like smutty stories, is not productive of any good, and the way to get rid of the bad effect is to clean up the seed or source of supply. There have been various ways of treating seed grain to prevent smut. The blue vitrol and the hot water treatment have each been successful when the work was done properly, but for the average farmer was too costly or complicated and neither method ever came into general use, although the loss some years ago was known to be great. A few years ago a new treatment, which is cheap, safe, simple and easy, was discovered which is now coming into general use. The new product, Formaldehyde, is obtained by evaporating wood alcohol into water, which is the strongest and most pungent disinfectant known today.

### The Treatment.

For treating smut in grain, one pound or one pint of formaldehyde to thirty-six gallons of water can be used in a large barrel, or if there is a large amount of seed to treat, three pounds to 108 gallons of water in a tank that holds four or six barrels will facilitate the work, as four or five gunny sacks full of seed can be submerged at once and while these are soaking another lot can be filled ready to put in when the first lot is put on the drain board for a few minutes before emptying on the floor to dry. In this way seed can be treated at a cost of not more than two cents per bushel for material and labor.

We have used this treatment for the past two years with results that have been surprising and very satisfactory. Our oats in 1900 were very smutty, so we got our seed from my brother, whose crop seemed to be free from smut, but we decided to treat the seed as recommended by the Experiment Station, but instead of sprinkling on the floor we found it easier to submerge the sacks in a tank for a few minutes, then allow them to drain and spread on the floor eight or ten inches deep, turning with a shovel night and morning for two or three days, when they were dry enough to sow in drill or seeder.

### Results of Formaldehyde Treatment for Smut.

Our oats that year were practically free from smut, as we examined the field very carefully and I don't believe there was one head in a thousand smutty, while the same oats not treated sown on my brother's farm were very bad, showing from fifteen to thirty per cent. smut. I had five sacks of the soaked seed left which my brother got, sowing in the same field with the untreated seed, and you could tell to the drill track where the treated seed began, but as he had not emptied his seeder there was some of the smutty oats mixed with the clean ones, so there was some smut at harvest time, but the difference was so marked that it convinced him and some of the neighbors who saw it and they used the treatment last year with good results. Last spring we urged its use by publishing our experiences in several of the papers in Polk, Barron and St. Croix counties and so far as I have been able to learn a great many tried it with satisfactory results, but there have been some partial failures.

A few, instead of submerging, sprinkled the seed and did not kill all the spores. In a few cases the druggists supplied an article they made themselves that was nearly worthless, so there are a few who have been disappointed. I find by asking the farmers at the Institutes that very few seem to think they have smut, but if there is a thresher present he will tell you that most of them have smut. While I know that some kinds of oats may be more subject to smut than others, the only safe way is to treat all seed sown, for we can't afford to lose from five to fifteen bushels per acre when it costs so little to prevent this loss.

## DISCUSSION.

The Chairman—How many farmers in the room treated their oats last year? Only a few. I wonder if you realize the immense tax you pay for not treating your seed?

Question—In submerging these oats, how long do you leave them in the water?

Mr. Bradley—About five minutes. We had fifteen gunny sacks. We would fill five sacks and put them into the tank, and when they had soaked five or six or seven minutes, we put them on the drain board and put another lot into the tank. We kept it up in that way. They must be left at least five minutes, and perhaps ten would be better, although five is sufficient if the solution is one part formaldehyde to thirty-six gallons of water. That will kill every particle of smut.

Mr. Jacobs—How long before sowing would you do this?

Mr. Bradley—I think last year it was a week or ten days. They dried off about the third or fourth day, so that we could sow in a seeder, but they wouldn't take any hurt on the floor if they staid there a month.

Question—Is formaldehyde a poison?

Mr. Bradley—Yes, wood alcohol is a poison and formaldehyde is simply a product of wood alcohol. Water will take up forty per cent. of the fumes of wood alcohol.

A Member—We had some left last year that we didn't need for seed, we fed it to the chickens, and it didn't harm them in the least.

Mr. Imrie—We sprinkled our oats, we had them on a cement floor and there was very little water which escaped; as the water ran out of the pile we threw it back, and they never dried at all before seeding; they were all swelled up and full of water, but it made no trouble in the drill. We had a few heads of smut, but very little, and, as Mr. Bradley said, by treating one year you prevent it the next year to a great extent. I sold a great deal of seed last year, because I had treated it the year before, and those that used that seed said it was practically free from smut.

Mr. Jacobs—One of my neighbors, who is a better farmer than I am, treated his oats and sowed them the next day. He said all he had to do was to open his seeder a little bit more, and it took a little bit more seed also.

Mr. Imrie—I knew just how many I sowed, because of having it in the sacks.

Question—Do you sow more to the acre of those wet oats?

Mr. Bradley—Yes, just a little, but not a great deal. A good many farmers have hesitated in trying this, because they think it is so much bother to dry them. As Mr. Imrie says, it isn't much work to dry them and you can sow them without being really dry.

Mr. Goodrich—I have a neighbor who practices a different method. He has two or three kerosene barrels with a hole bored near the center, so that they can draw off the water. They put the solution into the barrel with the oats, draw off the water and put it into another barrel, which is filled with oats, and he thinks he saves time. I asked if it did not take more of the solution, and he said it might take a little bit more, but it is cheap stuff and time is worth more than the extra stuff. He says that by opening his seeder wider, there is no trouble in sowing.

Mr. Convey—Is formaldehyde known by any other name?

Mr. Bradley—Formaldehyde and formalin.

Question—Can you treat barley the same way?

Mr. Bradley—Yes, we have done it, and it certainly killed the smut.

A Member—I treated about four bushels of oats and about ten bushels of barley with that solution, the same strength, and I couldn't see that it killed a particle of the smut in the barley, but in the oats it did.

Mr. Bradley—I think the barley might take more soaking to kill it than the oats.

A Member—I had a great deal of smut in my barley last year, and I asked Professor Moore about the treatment of it, and he said that this solution would fix the barley all right, but it will have to be stronger, instead of having it one to fifty he recommended one to twenty-five.

Mr. Johnson—Isn't it a fact that a good deal of the smut spores are retained in the ground from one year to another, so they will produce smut in the crop?

Mr. Bradley—I don't know about that.

Mr. Johnson—I have had experience for a number of years. We raise oats on one piece of ground and then put it into corn, turning under the oat stubble in the spring, the suckers in the oat field would start to grow again, and during the working of that corn, these suckers would come up and have smut on them, universally what came up had life enough to throw off smut.

Prof. Carlyle—I think you will find that Professor Moore has carried on experiments along this line. Professor Moore treated several hundred bushels of oats last fall, then scattered it on a platform, and dried it thoroughly in a few days, although we had very rainy weather. There is no difficulty in treating it in the fall, thoroughly drying it again, and having it germinate perfectly in the spring.

Question—Will this same treatment prevent smut in corn?

Mr. Bradley—I think not, from what I have heard.

Mr. Foster—Seedsmen are trying to sell us every year treated seed at twenty-five or forty or fifty cents a bushel more than ordinary prices, and I see no necessity of paying that as long as we can treat our own seed at an expense of about two cents a bushel. Now, I hope that very many in this audience are sufficiently impressed with the importance of this subject to treat their seed oats this spring. If they do not, they must either pay an extra price to some seedsman, or pay the penalty in another way. I hope you will all supply yourselves with the bulletins which have been issued on this subject.

Mr. Bradley—When you go out into your fields about the time your oats are nearly ripe and if you just look over the field and do not see any smut, do not take it for granted that there is none there. Look down close to the ground, the smut only runs up a foot or eighteen inches high, you will find it near the bottom if it is there at all, in two-thirds of the cases, and some seasons it is all low, perhaps only six or eight inches from the ground.

# CO-OPERATIVE CREAMERIES.

**E. A. CROMAN, Grass Lake, Mich.**

Let us first stop and see if we fully understand the term co-operative. Webster says it means "operating jointly to the same end." I believe there are very few, if any creameries that are, strictly speaking, co-operative. A creamery where they charge a fixed number of cents per pound for the manufacture of butter is not a co-operative creamery. A creamery where all patrons and stockholders share alike in the manufacture of the butter, in the profits and losses, and in operating expenses is a co-operative creamery. Are there any such? The nearest that any creamery company comes to being co-operative is one that is being operated on this plan; the running expenses,—by this I mean the pay for labor, coal, tubs, and all that goes into the cost of making and selling butter. One cent per pound is also added, which goes into a sinking fund. This is used to make repairs on the creamery and as a dividend. This plan has been in operation for the last ten years and has given the best of satisfaction. By this method all are served alike as near as may be. The patrons who are not stockholders, as well as those who are, pay the one cent per pound for the use of the creamery in addition to the cost of manufacturing one pound of butter. If we could have all patrons stockholders then we could have a co-operative creamery in every sense of the term. But let us do the best with what we have. If our methods of co-operating can be improved upon, let us do so at once; let us work in harmony. Co-operative dairying has come to stay. It has been tried and is successful.

The labor problem on the dairy farm is becoming a serious one; good and efficient help seems to be getting more scarce each year. It is, therefore, necessary that all practical methods for the saving of time and labor should receive our most earnest consideration. Can we better our methods of getting our product to the creamery? I believe the practice now in vogue of hauling the whole milk to the creamery and there having it separated, is losing a great many thousands of dollars to the dairymen each year. Not only is there loss in the cost of hauling the milk, but in the feeding value of the skimmed milk. Can we remedy this enormous expense, is the question. Yes, I believe we can by the use of a farm separator, either power or hand. I believe we can educate ourselves to take as good or better care of the cream thus separated than we can the whole milk. The cream thus separated upon the farm and delivered by the most up-to-date method will lessen the cost of manufacture at least one-half and with a great improvement over the present system as regards flavors, etc.

### The Home Dairy.

I want to say a word here in regard to the man who believes in the home dairy. I have the greatest of respect for him, for I know only too well how much time, hard work, and attention it requires. We each have our own way of doing things. If the home dairyman can get a better price per pound for his butter, enough more than the creamery can pay him so that he gets well paid for his time, then he can afford to be a home dairyman. The plan of operating a co-operative creamery that I have mentioned is one of the best that I know of. In this method of operating it is of interest to every patron to see that his neighbor gets his milk to the creamery, as every pound more that goes to the creamery tomorrow than was got there today lessens the cost of manufacture just that much.

### Handling of Milk for Creamery.

If you are a creamery patron be a good one. Start first by the selection of good, healthy cows. See to it that you have the proper food for your cows and that it is fed properly. Do not be a two or three cow patron. You will not be as well satisfied as regards results as you would be if you had ten, twenty, or more. Get your milk to the creamery in good condition. One ten-gallon can of poor milk might spoil one thousand or more gallons of good milk. If you live a distance from the creamery your milk should be well aerated and then cooled. Here is where I have known of some bad mistakes. A can of milk cooled suddenly without being properly aerated contains all the animal odors. When this milk gets to the creamery and is again warmed up it will give off these odors and is liable to taint and spoil a great many gallons of good milk. No butter maker, no matter how well he understands his business, can make good butter out of tainted milk.

### Selection of Officers for Co-operative Creamery.

I want to say a word in regard to the officers of this co-operative creamery. Great care should be taken in their selection. I believe that only stockholders who are patrons should hold office. They should be men who understand the care and feeding of the dairy cow and should be able to teach their patrons how to get their milk to the creamery in a proper way. I know that this is almost impossible in starting a new creamery, but as soon as officers are found that are not capable they should be weeded out and men put in office who will be a benefit rather than a hindrance. A manager is the most important officer to be selected. He should be one who has the faculty of handling men. The books of the creamery should be open for the inspection of its patrons at all times. The men who haul the milk should get to and from the creamery as soon as possible. In summer the cans should be covered and kept cool en route to the creamery. In winter they should be covered and kept from freezing, as frozen milk does not make good butter, and also the patron is not as liable to get a good test. Milk should never be hauled any distance in a wagon without springs, as the shaking of the milk often churns particles of cream into butter, thus rendering a good test impossible.

In this short paper I am in hopes that I have brought out some points that will provoke a good discussion.

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## DISCUSSION.

Mr. Goodrich—Under your plan, would you limit the amount of capital stock that each one can have so as not to get it all into the control of one or two individuals?

Mr. Croman—Yes, I would. I think that $100.00 is about the limit. If a man has invested only twenty-five or fifty dollars, he hasn't got very much to lose. If he has $100.00 in it, it is worth looking after, probably ten shares at $10.00 each.

Mr. Goodrich—Would you want the business men in the town who were not patrons of the creamery to have stock in it?

Mr. Croman—Oftentimes in starting a new creamery, it is necessary to get in business men, but as soon as the creamery is started, so you can get rid of them, have them step out.

Question—Would you have in your articles of incorporation a clause preventing one man from buying stock of another?

Mr. Croman—We have that in our articles of association. No man can change his stock without the vote of the directors; in other words, no man can become a stockholder in that creamery until he is voted on, and of course those who patronize the creamery who have no stock, have no share in the profits.

Mr. Goodrich—I know of a good many creameries where they are anxious to get in all the milk they can, they do let those who have no stock share equally with those who have stock. That certainly is unjust.

Mr. Croman—I found one such in this state, and the creamery was going down very fast. I advised them to reorganize, keep their stock in their own hands, and charge one or two cents per pound, on the plan that I have outlined in this paper.

Mr. Imrie—I have had some experience in co-operative creameries. We organized in western Wisconsin a good deal on the same plan as Mr. Croman has outlined, except that instead of taking one cent a pound on the butter as a sinking fund, we took the first year five cents on a hundred pounds of milk. We found we had taken a little too much; the next year we took four cents, and after that three cents on a hundred pounds of milk, which was set aside as a sinking fund, and out of this sinking fund were paid taxes, insurance, permanent improvements, and repairs on the creamery, and in limiting the amount of stock to stockholders, we fixed it at $250.00—we had to do that, because it was hard to get the stock subscribed, but no man can hold more than twenty-five shares, and no stock can be transferred without the consent of a majority of the board of directors. I think in all cases you should keep that stock right among the patrons. After we had been running two or three years, we bought a skimming station two or three miles distance, we had to issue new stock at that time, and had no difficulty because we were paying good interest on our capital stock.

Mr. Goodrich—I like Mr. Croman's idea of inducing the farmers to have farm separators. The most successful operators of creameries in this state are where the milk is all separated on the farm. There is the West Salem Creamery that last year made 948,000 pounds of butter, and paid to the patrons $199,000.00. The cost of gathering the cream, making the butter and delivering it at the station was just two cents a pound, and that is what it has averaged for the past ten years and the butter netted to the patrons, on an average, twenty-one cents a pound. Mr. H. D. Griswold, one of the patrons who produces more milk in the winter than in the summer, is averaging twenty-two cents a pound. There are 350 patrons, and they all have farm separators; there is no separator in the creamery at all. One hundred patrons who have a small number of cows raise their cream by the gravity process, but they are fast getting the farm separators, and the gravity process will soon be a thing of the past.

Mr. Imrie—Do they keep the cream from the hand separators and the gravity process cream to be churned separately in the creamery?

Mr. Goodrich—They do not. The cream is graded according to quality, so that no matter how a man gets his cream, if he can deliver good cream that is all they ask of him. I know it is sometimes claimed that they do not make as good butter where the cream is separated on the farm, but that is not necessarily so. At this creamery at West Salem, the cream gatherers must examine the cream, and if they think Mr. A's cream is not as good as it ought to be, they keep it separate from the rest; then when he takes it to the factory the butter maker decides what shall be done with it. They have two vats; one of which holds the better quality of cream; the other is what they call the "stink" vat. They are worked up separately and bring from three to four cents a pound difference. The cream in the other vat brings as good a price as any creamery butter in the state of Wisconsin. I have been in creameries where they were making three kinds of butter, one from separator-gathered cream, one from whole milk, and one from gravity-gathered cream, and the best cream and the best butter was from the separator-gathered cream, and it all was taken care of properly, of course.

Mrs. Howie—When they market that butter, Mr. Goodrich, do they stamp upon it the name of the vat that it comes from, so the consumer may know?

Mr. Goodrich—It will advertise itself all right.

Question—Was that price that you named for butter or butter fat?

Mr. Goodrich—That was the net price for the butter. The butter fat was twenty-four and five-eighths cents per pound and the butter was twenty-two.

Mr. Croman—After our creamery had run awhile, we began to get ten and fifteen thousand pounds and we began to have a little more off butter. You know that there will some poor milk come to the creamery, frozen milk; there will be new patrons who will drop in and you have got to watch those things. We would go out into the country and try to educate those men, but some of them wouldn't listen, they would bring the milk sour, oftentimes off flavor, so we devised a plan to fix those fellows. We said, "This is a co-operative creamery and we can't afford to mix your poor milk with our good milk. We will do this, the milk that comes there frozen and sour, off flavor, we will churn by itself, without even separating." So we put it into the churn and churned it, and that butter went onto the market, not as Lakeside-Elgin butter, but butter without any stamp on it at all, and it sold for what it would bring, and it didn't take those people long, when good creamery butter was selling for twenty-five to thirty cents a pound, and they had to take eighteen to twenty cents, to find out that they were losing money. The way to fix those fellows is to give them a taste of their own butter.

Mr. Stiles—In any community where the farmers are going to organize, is it best for them to organize first, elect officers, then have those officers go and visit a number of creameries through the state, and see how they are built, and visit supply houses and then go home and build the creameries themselves and buy their own supplies; or is it best to let some creamery man come up and organize the farmers?

Mr. Croman—If you will organize and build it yourselves, you will build it from one to two thousand dollars less than the creamery man will build it for you.

Mr. Thorp—And that brings up to mind the kind of a co-operative creamery that I am opposed to. Last fall, up near where I live, thirty miles north of here, there were a lot of sharpers came around to organize a creamery. I happened to be up there, and questioned them about it, asked them what their plans were, and they told me, and I told them I was glad I happened to be there, I was going to try to fight that creamery to the finish. They had their meeting, they made their nice talk, telling the farmers how many thousands of dollars they could make out of the dairy business in a short time and got the farmers all worked up ready to take stock, and I got up and told them before they subscribed for any of that stock that they had better find out whether these men knew anything about a creamery or not. I meant the men in the meeting who were talking about taking stock. I took a vote on it, and I found there were only three men in that audience who had ever patronized a creamery. These men were going to organize a co-operative creamery there among that class of men and were going off to leave them to run it. In the specifications that they exhibited there for a creamery, they were going to board their building one thickness on the outside, and there wasn't a farmer in that room that knew that would not do for a creamery. After I got through talking, the gentleman got up again and he tried to laugh off what I had told them, and he began working them over on his side again, and I had another set-to and came pretty near being put out of the hall before I got through, because those men were larger than I was, but anyhow he could not get the subscriptions that night to his list. However, he got a German friend to come up and help him, and they did put in a creamery in that locality, and it isn't worth much; there is nobody there that knows how to run it and it has cost those people $5,000.00 to build it. There have been three of them built this winter in that locality, and those men are making money going around among the farmers and organizing them. So I advise any farmers who are thinking of organizing a co-operative creamery to look into the matter carefully, don't let these swindlers come around and swindle you out of $1,500.00, as this man did, and as they are doing right along in this state, although we have talked to and warned the farmers in the Institutes all over the state. The result is this, those people have got the creamery, the man has got his money, he has left the country, gone to build other creameries, and those farmers are there with nobody to run their creamery and nobody at the head of it that knows anything about it, and the dairy industry has been set back at least ten years in that locality just because those farmers were so foolish that they would let that man come in there and humbug them in that way. The first thing to do in a co-operative creamery is to elect the officers and select a good committee to go out among the co-operative creameries and go to the dealers of creamery supplies and see what prices they can get, and try not to build a $5,000.00 creamery that isn't worth $2,000.00 after it is built.

Mr. Croman—That is what I say, find out what you want and build it yourselves, you can save from $1500.00 to $2,000.00.

Mr. Simmons—Do you think we can make more money out of our butter by patronizing a creamery that by making it at home?

Mr. Croman—That depends on your surroundings. If you have private customers for your butter and you live near a large town where you can make as much money as at the creamery—you have really got to get more, of course, because it costs you something to manufacture that butter, but if you can get enough more to pay you for the manufacture, that is all right.

Mr. Simmons—Can't we make better butter on the farm?

Mr. Croman—If you have the same facilities on the farm as the creamery has, you ought to make better butter, because you have the full handling of the milk from the time it comes from the cow until it is in the tub.

Mr. Scott—You are making these remarks, however, to Mr. Simmons, not to the average farmer.

Mr. Croman—Yes. For the average farmer, it is certainly better for them to send their milk or cream to the creamery.

A Member—We manage things a little differently from what Mr. Stiles said, although we bought the machinery ourselves. But I think it is desirable, if you can get a good butter maker, to hire him first, get one from the Dairy School if you can, and let him see the farmers and get acquainted and also have him help build your creamery. Then go ahead, get carpenters, put up your creamery, secure bids from the creamery supply houses, and put up your plant yourself.

Mr. Croman—I think I should object to that, because you do not always keep the same butter maker. The first butter maker we had wanted continual changes, there wasn't anything right; the next one we educated ourselves. If

I was going to have things just as I wanted them, I would put the young man who was to be our butter maker into the factory. The officers should be elected first, and they should visit these creameries and put up a plant according to their ideas. As soon as you turn your business over to somebody else, that business is going to pieces. Men who organize a creamery company must understand that they have got to give a certain portion of their time to this business, and if they don't intend to, let them stay off. I have got off my binder and gone down to that creamery a good many times. I have gone out of the harvest field, the cornfield, to go down there, just because of some little difficulty. When we organized, I went down there and learned how to make butter the first thing. I knew how to make butter at home, but I learned how to run that machinery, and then we educated other men who were interested in this creamery, so that if anything went wrong, we had it right in our own hands, and you cannot have a successful creamery in any other way. How would you run a bank, or any other business, if the directors did not understand the business? You have got to know the business from start to finish.

Mr. Utter—Isn't it possible to obtain such a knowledge in a state where there are so many fine creameries as have been built here?

Mr. Croman—Yes, you have all got creameries within six or eight miles where you can learn a lot, you can get the most improved machinery and see how it works. It is not so in our state. I was in a factory the other day where they are getting about 15,000 pounds of milk a day, and they are compelling the butter maker to ripen his cream with a rake. That is all wrong. What are we after in all this? We are after more butter from our product; we are after a saving in time and labor. Where it took three men to run a creamery ten years ago, two men will do it with ease today.

Prof. Carlyle—I do like the sentiment expressed by Mr. Goodrich in favor of farm separators. Naturally, I look at the stock end of the business more than I do the creamery end of it. Now, it seems to me we have been carrying milk to the creamery, pooling it all in one lot, and carrying the skim milk back from three to eight miles, long enough. You never know whose milk you are taking back; you are never getting it back in the same condition. As far as I can estimate from the skim milk we get back, I do not believe that skim milk is worth within ten cents as much per hundred as the skim milk we get from our own barns to feed sweet to our calves and pigs. That is a point which should be taken into consideration in operating creameries. What is the use of hauling 15,000 pounds of milk through the roads we have in this country, and hauling it all back again to the farm, when anybody can separate it on the farm and one man could carry in the cream where it takes fifteen men to carry in the milk to the factory? If we look at this matter from an economical standpoint, taking all the conditions into consideration, gentlemen, I believe that point is one of the most valuable that can be made in connection with our co-operative creameries. There is no comparison at all in the value of the skim milk for feeding to calves between that separated on the farm and that brought back from the creamery. We get back the wash water from the vats and everything that goes into it to make up the amount which the farmers demand as their dues. Calves raised on that kind of stuff don't amount to much, as compared with calves raised on their own milk at home.

Prof. Shaw—Is it an easy matter to keep calves healthy that are fed on the milk that comes back from creameries?

Prof. Carlyle—Two years ago Professor Farrington carried on some experiments fcr pasteurizing or sterilizing skim milk. He had many complaints that the digestive organs of small pigs were suffering from the effects of feeding such milk and he came to the barn and, asked us to start a short, simple experiment, just a little practical experiment as between some of our own milk sterilized and some which was brought back from the creamery. We found all sorts of troubles, the calves were scouring, the hair was rough, and they were off feed for a long time, while those that we were giving the sweet milk from our farm went right along all right in every way.

Question—How much skim milk do you feed a calf?

Prof. Carlyle—Never more than two quarts of milk at a time to a young calf. Of course we increase that. I think one cause of digestive troubles in calves is feeding too much.

Mr. Goodrich—In regard to the difference between making butter on the farm and patronizing a creamery. We hear that question thrown in quite often to the disparagement of the creamery. For a great many years I made butter on the farm, and I made several hundred dollars more than I would have made if I had patronized a creamery, but that does not prove that the creameries have not been of immense value to this state. Where a creamery is started in a community, it benefits every man, woman and child in that community, and it also benefits the man who is making butter on the farm. When we all made butter on the farm, do you remember what we used to get for the butter? My books show that I sold it for eight cents a pound, and paid ten cents a pound for the brown sugar that I was obliged to trade it off for, but when the creameries went to making up milk into a good quality of butter, then the private dairyman could share in the benefit just the same as the creamery, so I beg of you do not say anything in disparagement of the creameries.

Mr. Thorp—I want to disabuse any one who may have received the idea from what I said that I am opposed to the co-operative creamery. I certainly am not. I am opposed to these sharpers going around and humbugging the farmers, starting creameries where they are not ready for them, where they haven't got cows enough to supply milk enough to run a creamery. I live right in a creamery locality, I can see two or three of them from the top of my barn, and I know that the farmers have all made money down in that locality, but I know that there are localities in northern Wisconsin where they are going to lose money, and be humbugged by those sharpers that I speak of.

Prof. Carlyle—I heard the remark awhile ago that the reason Mr. Thorp was so sore on this creamery question was because that $2,000.00 was put into a creamery instead of into real estate.

Mr. Thorp—That isn't the reason. I had two good farms right near that creamery, and I don't like to see the dairy interest damaged for eight or ten years.

A Member—That very same plan that Mr. Thorp speaks of was tried on us in the town of Oakfield, twelve or thirteen years ago, but we were sharp enough to stop them.

# THE DAIRY COW FOR WISCONSIN.

**Prof. W. L. CARLYLE, Madison, Wis.**

Prof. Carlyle.

It is with pleasure that I for the first time avail myself of an opportunity to attend a Round-up Farmers' Institute in Wisconsin. I regret, however, that my subject is not the dairyman for Wisconsin rather than the one announced by the chairman.

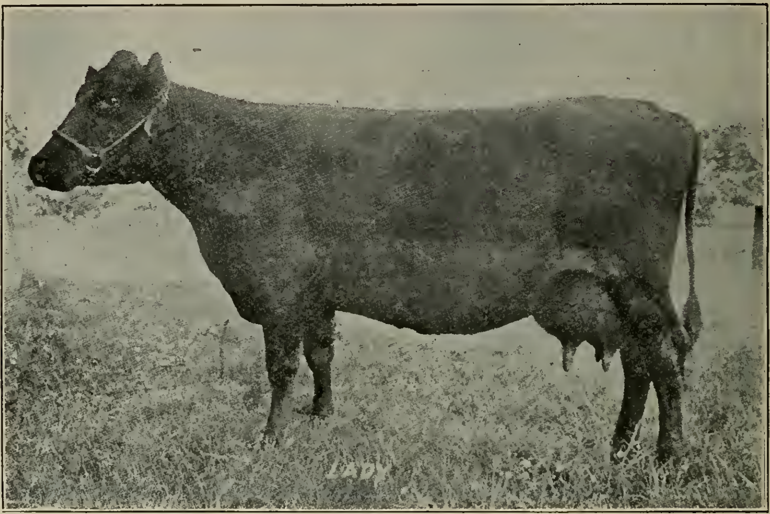
## Skilled Dairymen Wisconsin's Great Dairy Need.

During the past six years that it has been my privilege to live in this state, my attention has been largely taken up with problems relating to the dairy cow and the profitable production of milk and its products and I wish to say that the crying need at present in the dairy industry in Wisconsin is not so much dairy cows as it is skilled dairymen and feeders. The cows of Wisconsin have had so much of abuse and slander thrown at them in the years that are past that I wonder how a really honest, enlightened and up-to-date dairyman can look some of our grand, old, matronly cows in the face. If the average yearly production of milk and butter of the dairy cows of this great dairy state is as small as some of our dairy authorities so confidently state, which by the way I believe is gross slander, then I wish to go on record as saying that the dairymen of the state are to blame for the low production and not the dairy cows.

After fifteen years of study and observation and five years of experimental investigation of the dairy capacity of cows representing practically all the types of cows kept on the farms of this state, I am willing to risk my reputation on the statement that there is not a healthy, normal calf dropped upon any of the farms of this state, of any breed, that will not, if properly reared, fed and cared for from birth onward, produce at least 300 pounds of butter in a year, when at her best. At the same time, I believe quite as firmly that there are many dairy cows bred for the specific purpose of milk and butter production through many generations that will produce 600 pounds of butter per year under most favorable conditions as readily as some other cows not having these inherited tendencies will produce three hundred pounds. While I do not wish to advocate the breeding of anything but the best of dairy cows, or to underestimate in any way the importance of inherited tendencies, yet I am assured, from the results of our work at your Experiment Station at Madison, that there are thousands of choice dairy cows in our state that are not returning their owners a profit, for the reason that they are not surrounded with the proper environment, including suitable feed, shelter and management.

Of the cows purchased for our dairy herd at Madison, as many of you know, only two or three have cost above $65.00, and many of them much less. They include cows inheriting beef tendencies, as well as those dairy tendencies, and yet there is not a mature cow in the herd, except a pure bred Jersey or two, that has not produced over 400 pounds of butter in a year. The trouble with so many of the dairy farmers in our state is that they are accustomed to look upon and think of a cow as a machine, into which if you put a certain amount of raw material you will get a certain amount of finished product, irrespective of the fact that each and every cow is an individual with certain peculiarities and tastes that must be studied and understood, and the most suitable raw material supplied in the matter of feed, not to mention the numerous other conditions, before the particular, individual cow will manufacture the finished produce to the best advantage.

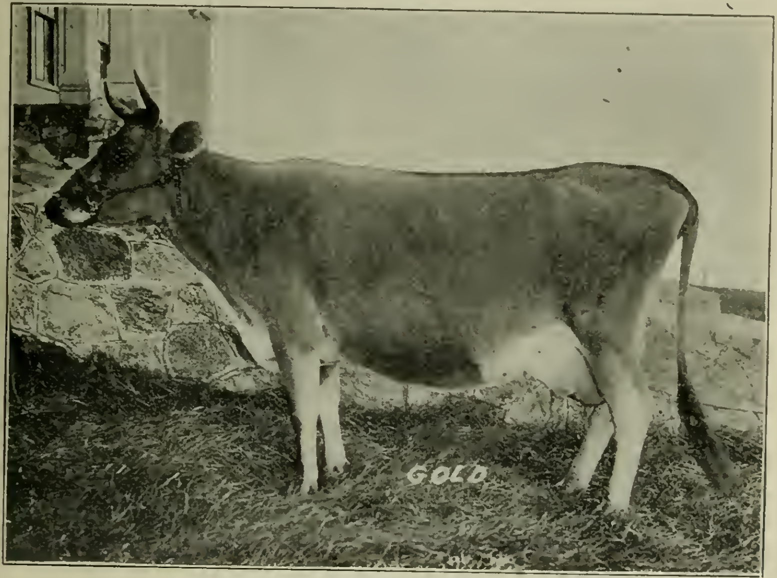
Of the fifty or more cows that have been in the Station herd in the past five years, the three cows producing the greatest amount of butter in a year have belonged to three different breeds and, while they had many of the essential characteristics of large dairy producers in common, yet they all showed strongly the type of the breed to which they belonged. The largest yearly record of butter production of any cow in the herd was made by a grade Red Poll; the second largest record by a pure bred Jersey, and the third by a grade Shorthorn. (See accompanying photographs of these cows.)



**Grade Red Polled Cow "Lady."**

Yearly production 3,403 lbs. milk; 549.1 lbs. butter fat, and 640.6 lbs. butter, with a profit of $88.49.

The phenomonal production of these cows was made possible by a careful study to supply each one of them with the kind of feed and environment that was best suited to the particular demands of the individual animal for greatest production. If all three cows had been given similar feed and treatment in every way, there would have been a wide difference in their production and some of them would have yielded much less milk and butter.



Jersey Cow "Gold."

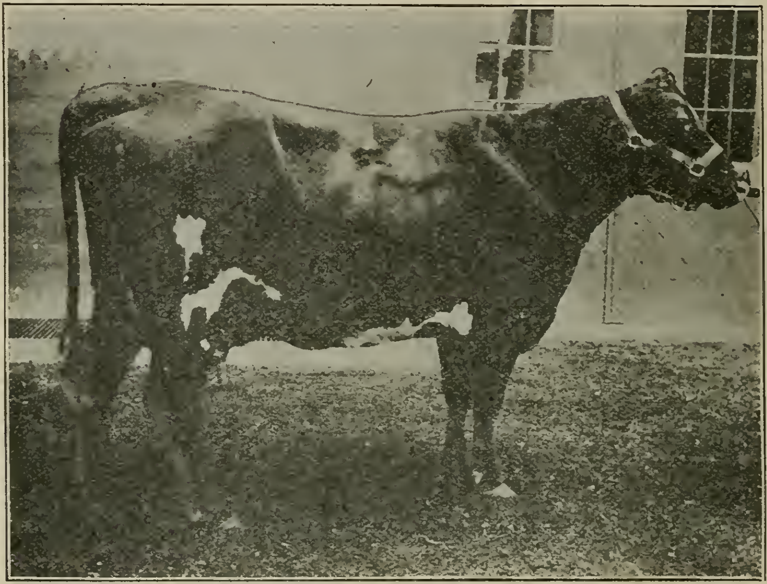
Yearly production 8,393 lbs. milk, containing 502.12 lbs. fat, equivalent to 585.81 lbs. butter, with a profit of $84.55.

### The Merits of a Special Purpose Cow for Wisconsin.

I must not forget, however, that I am expected to talk about the dairy cow for Wisconsin. This I take it means the kind of cow that the farmers of our state who are particularly interested in dairying should keep. In discussing the question from this standpoint, I would unhesitatingly recommend the selection of the special-purpose dairy cow. I know that I have been severely criticized by many dairymen in this state because I have had the presumption to say that there was a place, and a large one, in this state for the cow that will combine fair milking qualities with the ability to produce calves that will make beef at a good profit. In spite of this criticism, I maintain that this kind of cow, if well cared for and properly fed, will return a good profit to her owner, and I am almost convinced that this is the only kind of grade beef cow that the vast majority of our farmers will find profitable in Wisconsin. At the same time, I believe just as firmly as ever I did in the superiority of the special-purpose dairy cow for dairy production. I do hope, however, that there are no farmers or dairymen present, or in the vicinity of Marshfield, that are so narrow between the eyes that they cannot see two things at the same time and recognize their merit for different purposes.

## Characteristics of a Superior Dairy Cow.

Now then, how shall we recognize the special-purpose dairy cow when we see her, or, in other words, what particular characteristics or type must a cow possess to be a superior dairy cow? First and most important is, a large, long, deep and capacious body or barrel, indicative of immense digestive and assimilative powers. Our most profitable dairy cows are those that will consume the largest quantities of rough feed grown upon the farms of Wisconsin and will convert this cheap feed into blood that will make milk and butter in abundance. Second, our cow must have the tendency to convert all of the material assimilated that is not required for vital functions into milk and butter without storing it in the tissues of her body to make flesh and fat. This tendency is best indicated by a fine, clean cut head and neck, very light shoulders, a prominent back bone, sloping ribs and thin and open thighs. Third. She must have a good-sized udder of fine quality to elaborate the milk freely from the large quantities of blood directed to it. A coarse and meaty udder on a dairy cow is to be avoided. The udder tissue should be elastic and springy, indicating activity and quality. Associated with the udder are the milk veins, which should be numerous, large, prominent, branching and extending well for-



**Grade Shorthorn Cow "Rose."**

Yearly production 11,162 ℔s. milk; 501.11 ℔s. fat, and 584.63 ℔s. butter, with a profit of $83.80.

ward, entering the body through several large orifices, all of which indicates a very large supply of blood passing through the udder. Lastly, and of much importance, see that she has plenty of width through the chest, or just back of the shoulders, midway down on the ribs, a good, wide loin, hips and rump, a straight, strong back, a large bright eye with a lively expression and a bright, sprightly appearance generally, all of which indicate a good constitution and strong vitality.

A cow possessing these characteristics will present the appearance of the Jersey cow "Gold" on this chart. (See Cut.) That is one of the cheapest and largest producing cows that has ever been in the university herd.

A great injury has been done the dairy industry of our state and the whole north-west by the introduction of a great many scrawny, small dairy animals of both sexes that have had nothing to recommend them, except their lack of beefiness. Many people that should have known better have, inadvertently perhaps, disseminated the doctrine that the essential feature in a good dairy animal was a lack of bodily development. To my mind, this is a great mistake and to the general practice of this theory, more than any other thing, is due the present unpopularity of the Jersey breed of cattle for dairy purposes. No other breed or type of cow that has ever been introduced into this country will produce milk and butter more profitably than the right sort of Jerseys, and it is exceedingly unfortunate that so many of our Jersey breeders have lost sight of the importance of size, strength and vitality in breeding their cattle in order to follow a temporary fad for extreme refinement and delicacy in their stock. A good dairy cow should not weigh much less than 1,000 pounds when mature, and she should have all the evidences of strength and constitution possible without sacrificing refinement and femininity. It is well to remember that lack of bodily size and vigor is not necessarily an evidence of dairy quality or maternity, and it is quite possible and very desirable to have a large, strong dairy cow and yet have her with an abundance of refinement and quality to indicate lack of beefing tendencies.

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## DISCUSSION.

Question—These three cows giving the largest yields—which of them made the best profit?

Prof. Carlyle—The Jersey cow made the butter at a slightly lower cost per pound than the Shorthorn. The Red Polled cow made it a little more expensive.

Mr. Goodrich—I have some figures on this particular question. You know I have taken a cow census on several occasions. I did it with the patrons of Hoard's creamery, a hundred of them, and I tried to draw from it all the lessons I could. I found the number of cows that each patron kept and what feeds he had fed them, and charged every herd, and then got the returns from the creamery. I sorted them out by breeds to see if there was anything to be learned by that. There were some full blood Jerseys, and a good many high grades, I called them all Jerseys, and so on with all the breeds. Now, there were twenty-eight herds of Jerseys, 466 cows; the average amount of milk was 4,798 pounds per cow, the average amount of butter was 244.7. The amount of money received from each dollar's worth of feed was $1.62. The net profit per cow, above the cost of feed, was $17.50.

There were nineteen herds of Holsteins, 450 cows; 6,081 pounds of milk per cow, 255 pounds of butter per cow, which was 10.3 more than the Jerseys averaged. The amount of money made for one dollar's worth of feed was $1.54, and the net profit per cow was $16.90, fifty-nine cents less than the net profit on the Jerseys.

Of the Guernseys there were eleven herds, 185 cows. The amount of milk per cow was 5,141 pounds, the amount of butter 252.5, two and one-half pounds less than the Holsteins, and seven and one-half pounds more than the Jerseys. The amount of money for one dollar's worth of feed was $1.60, just two cents less than the Jerseys, the net profit per cow was $17.92, a little more than the others. Now you will see those three breeds ran almost exactly equal. Now then we come to the dairy Shorthorns, 113 cows. The amount of milk was 5,436 pounds per cow, the amount of butter 240.8, four pounds less than the Jerseys. The amount of money for one dollar's worth of feed was $1.48, a little less than the others, and the net profit per cow was $14.77.

There is one other style of cows that I wanted to reach, and that was the general-purpose Shorthorn; there are only a very few of them in that part of the country, four herds of fifty-four cows; the amount of milk was 4.219 pounds, the amount of butter per cow, 194.4, the amount of money for one dollar's worth of feed was $1.22, and the net profit per cow was $7.08. Those were high grade Shorthorns that were being kept for beef and butter both.

Prof. Shaw—These are certainly very interesting figures. I take it for granted they do not take into consideration the value of the skim milk obtained from the different cows. Sometimes I think that should be taken into consideration. I think skim milk is worth about fifty per cent. more than we generally value it, especially when we get it at home with the separator, and that makes the question of the quantity of milk a matter of a good deal of importance on the farm. Then, evidently, you have not considered the value of the calf.

Prof. Carlyle—And you did not take into consideration either the breed of the men who fed those cows.

Mr. Goodrich—They were supposed to be about average men. I went right along one road and took every man, good and bad, and the average of the whole hundred was 241 pounds of butter per cow, and it certainly shows there are pretty good dairymen down in that part of the country.

Supt. McKerrow—Wouldn't you expect the men who had worked into these dairy breeds to be better dairy feeders than the fellows that are keeping double-purpose breeds?

Mr. Goodrich—They were better feeders. There is one other kind of cows I have got to talk about. There was a set of men down there, as there is everywhere, that are never just satisfied that they are on the right course. They commenced to grade up their dairy herds by using a Jersey sire. When they came to see the calves they got, little, scrawny things, they didn't like them, although they did like the rich milk, so they said to themselves that they were going to have something bigger, and they used a Holstein so as to give more quantity, they had already got richness, quality, now they wanted quantity. After they came to see the Holstein milk, it looked a little too blue, though there was lots of it. They had heard that the Guernseys put a lot of color into their milk, and so they used a Guernsey to put in color, so you see they had bred for richness and quantity and color. Now, I classed those fellows and their herds as mixed dairies. There were nineteen herds, 346 cows; the average amount of milk was 4,455 pounds, and the average amount of butter was only 208.1 pounds, while those who had stuck to one line ran from 244 up to 255 pounds, and the net profits for these men was $12.14. Now, I really believe that their cows were capable of producing just as much as any of the others, but these men do not have the same love for a special breed and consequently do not take as good care of them. I believe in loving one kind of a cow and loving one woman.

Mr. Convey—Can you determine from the per cent. of butter fat anything as to the comparative cost of the butter? In other words, a cow producing a low per cent. of butter fat would not be likely to be as economical a producer, would she?

Prof. Carlyle—The Jersey cow which has given the second largest butter record in our herd and produced butter the cheapest of any cow in the herd, had the largest per cent. of butter fat in her milk, her average for the year is about six per cent. We also have a cow in the herd that does not average much above three per cent. of butter fat, and she is one of the cheapest producers, so I don't think you can tell anything about it from the percentage of fat in the milk. Now, we bought at the Experiment Station five years ago, a great, big Shorthorn cow, which most of the visitors at the Station, Mr. Goodrich included, thought wasn't worth anything. Prof. Henry went for me for keeping such a cow in the barn. The first year we had her she gave 219 pounds of butter, and I thought she was not worth keeping, nevertheless I wanted to see what she would do, so I kept her. I wanted to give her as good a show as any we had. So we weighed her every week, and we weighed every milking, and every pound of feed she ate, and the next year she gave 264 pounds of butter. She had been to college one year, you see. The next year she gave 426 pounds; that was her last year's record. Now, that was simply the effect of knowing how to feed that cow, and that was what I meant when I asked Mr. Goodrich about having a high grade of dairymen.

Mr. Bradley—When will she graduate?

Prof. Carlyle—I expect to graduate her this year. She is a big red cow by the name of "Pauline." One other point, she gave 219 pounds the first year and 264 the second, and the second year she did it on less feed and less expense than the first year, and that was simply because we knew the cow better. I do not attribute that improvement to the cow at all, I attribute it to the feeders.

Supt. McKerrow—As I remember that cow the first year, she had a very good beef form, that is, a wide, smooth, fleshy back.

Prof. Carlyle—When that cow is dry, she weighs 1,560 pounds, she is a beef cow, and every one condemned her. When she is dry and getting ready for her next year's work, she is as fat as ever she was, but under our feeding, when milking she is a different type of a cow. She does flesh up when she is dry. A man must study his cow. I would much rather have taken for my subject here the kind of dairymen we want for Wisconsin.

Supt. McKerrow—Next year you may talk on the kind of dairymen.

Mrs. Howie—The first year you kept that cow, did you keep her on a cement platform, and the last year, what kind of a platform did she have?

Prof. Carlyle—We kept her on a cement platform all the time. We have only used a wood platform on top of the cement platform for the past winter, and we completed her record last fall. Speaking of cement platforms, I want to tell you something of our experience. When we built the dairy barn, we put in an entire cement floor, including mangers and gutters, we wanted everything as clean as we could keep it. You will remember that eight years ago the entire herd of cattle at the university farm was sold out, only two of them were found not to be tuberculous from keeping in a basement stable, without adequate light or ventilation, and Professor Henry decided that this time we would have a barn which we could keep clean and be well lighted and ventilated. For four years we kept the cows on that cement floor. Every year I had from one to five cows in the hospital stable with rheumatism, with caked udders and trouble of one sort and another, and I made up my mind finally that there was some other cause than irrational feeding or exposure, because the cows were cared for in the best way we knew how. I had to dispose of three of the cows, one because she got so lame from rheumatism she couldn't walk.

Question—You sent her to Chicago, I suppose?

Prof. Carlyle—No, sir, I sold her to a man who wanted her; he had a little pasture and he said he didn't mind the rheumatism so long as she was giving fifty-six pounds of milk a day. We covered that floor last fall with an inch flooring, pine wood, just ordinary rough flooring, made in sections, so that we could raise it up and flush out the stable with water, as we did once a week, and we haven't had a single cow this winter with rheumatism, and we haven't had but one that had a caked udder, and that was immediately after calving. I believe that a cement floor is not a satisfactory thing for dairy cows to lie upon, and I reached that conclusion after four years' experience; at the same time, I believe that a cement floor in a dairy stable is one of the most essential things in the equipment of the stable, with gutters and walks behind the cows, enabling you to keep everything tidy and sanitary; but I believe it should have a flooring on top of it, in the portion where the cows lie. One year on this cement floor we cut all our straw; two years, we used shavings, and one year we used large quantities of long straw, and none of them was satisfactory.

Mr. Scott—I have heard people who ought to know say that if we use plenty of straw on top of the cement floor there will be no trouble.

Prof. Carlyle—We use more bedding than dairymen ordinarily do.

Question—Won't the difference between the value of the Shorthorn calf and the Jersey calf make up the difference in the receipts of the cow for the year?

Mr. Goodrich—It depends on the market you have for it.

Question—From the beef standpoint, you would be pretty sure to make up the difference.

Mr. Goodrich—I am not a beef man.

Prof. Carlyle—I only recognize two classes of cows in Wisconsin—the dairy class and the beef class. The Red Polled and Shorthorn cows I spoke of, I put in the beef class. They are ordinarily described as dual-purpose cows. In my opinion, we have no place in Wisconsin, on the average farm where they are not breeding pure bred stock, for beef cows. I do not believe there is a farmer in this state that can afford to keep grade beef cows through a whole year for the value of the calf at weaning.

Question—I would like an answer to that question about the difference between the Jersey calf and the Shorthorn.

Prof. Carlyle—We have fed down there at the Station in the past two years, two calves from birth, and kept a record of all the feed which those calves ate. We have three more that are a year old. We exhibited both of the two steers at the International Show in Chicago. The first one, a grade Shorthorn from the cow that gave us 426 pounds of butter last year, cost us, as I remember it, about $92.00 to raise. That steer cost us, under the conditions which we have to feed them, that is, very little pasture, largely fed on grain feed, in the vicinity of $92.00. We sold him in Chicago, after going through the carcass test, for $108.00. Last year we had a Jersey steer from one of the best cows we have, a cow that has been designated by many as our very best type of dairy cow, out of a Jersey bull, which we consider a remarkably high type. We fed this calf from birth until market, and it cost us about $89.00 to feed him. We fed him the same as the other one, and he was good enough to win the third prize in that contest. He cost us about $89.00 to feed him, and we got $83.00 for his hide and carcass, fed under the same conditions as the other, only that he had more pasture. These are the facts, take them for what they are worth.

Prof. Shaw—What class did that cow belong to that produced the 426 pounds of milk and that remarkable calf?

Prof. Carlyle—I used her in my classroom to tell my students that she is the kind of beef cow they should keep if they wish to produce beef in Wisconsin.

Mr. Rietbrock—Is there a class of cows of that kind that you can breed from and produce them?

Prof. Carlyle—Yes, sir.

Mr. Rietbrock—Or is it only an exceptional one, as in the hennery of Mrs. Howie she has a hen that produces double-yolked eggs, and she is trying her best skill to reproduce that hen and can't do it. I don't want to put my judgment up against yours, but my experience extends over a considerable length of time, and I have thought of it a great deal, and I have almost come to the conclusion that such a cow is an exception. I know that a great deal of time has been spent to find another one so as to go into the contest. The farmers of Wisconsin want to know about the kinds of cows that they can get hold of.

Prof. Shaw—The gentleman seems to assume that this kind of a cow cannot be bred. Down here in your own state, at Richland City, there is a man breeding those cows right straight along, and that man is James W. Martin.

Prof Carlyle—Mr. Rietbrock asked me if I thought that cow was a freak or not. Now, I carried on as close study as I know how to give any subject, in regard to this question. I have bought cows representing as nearly as I could this type of cow in Wisconsin, without knowing any single butter record from any of them. Everybody said they were beef cows of the ultra order, while others said they were dual-purpose cows. I think there is only one cow down in that barn, and we have twelve or fourteen of this class, that has not reached 400 pounds. One of them is a pure bred Shorthorn cow, furnished us by Mr. Arnold, that has produced 429 pounds in a year, and has given us a calf that we have been offered $200.00 for to head a beef herd.

Question—I would ask if other gentlemen here have had the same experience as Professor Carlyle with cement floors? We are going into cement floors around here on the strength of the Experiment Station barn.

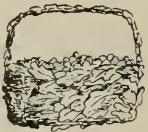
Mr. Croman—We have used cement floors with boards under the cows, and they are all right.

Mr. Scott—I think so, too.

Mr. Grogan—We have used cement floors without boards, and we do not have caked udders or rheumatism, but we do not leave those cows in from October till May. I wouldn't want to put a cow into a stable, onto a cement floor, and keep her there the whole year through. I believe they should be turned out once a day, and if they are, I don't believe it is necessary, after four years' experience, to plank a cement floor.

Mr. Rietbrock—Five years ago, I built over an old barn. I put in cement floors throughout the whole barn, but at the same time put onto the stable floor one inch pine boarding. Three years ago I built another barn, and in that I put in the cement floor, because it was suggested to me that it was not quite as sanitary. Having a quantity of planing mill shavings at my disposal, I thought I could overcome the trouble, so I put them with some straw on the cement floor. My cows go out for some time in the middle of the day, but most of the time stay in the stable. I have noticed that they will occasionally get the shavings out from under them and get the udders down onto the cement floor. I put the boards on the top of the cement, and I like it better. Put them on in sections, so they are easily taken up, and the place cleaned out.

Supt. McKerrow—My remarks will be on this beef cow for Wisconsin, or, to please Professor Shaw, I will call it the "dual-purpose" cow. When I was in England, in the summer of 1900, I spent four days with Mr. George Adams at Farringdon, Berkshire, in visiting his dairy stock farms. There were 500 cows in milk, which was being shipped to the London market, and I found, by talking with the milk dealers afterwards, that Mr. Adams has the reputation of being the best, largest and oldest shipper of milk to that market. I saw his records—I do not remember the individual cow records—but they were large for the amount of milk produced each year, and every one of the 500 cows was a Shorthorn, all after the type described to you by Professor Carlyle as a dairy cow, short legs, large capacity in every way—full of constitutional vigor. I also saw a large number of steers, the product of these cows, that were first-class beef steers. I said to Mr. Adams: "Have you tried the dairy breeds?" And he said, "I have, but my Shorthorn herds have made me the most money." Now, remember this, beef is higher in England that it is here, which was in Mr. Adams' favor. I questioned him a long time. He told me that he had been breeding this class of Shorthorns for forty years; this herd was not the product of one year or five, but of forty years, with an ideal cow of the same class that he had produced in his mind all the time. Now, I am not saying this to suggest to the farmers of Wisconsin to breed Shorthorn cows for dairy purposes, but I am saying this to make this point, that it is only the man who has a fixed idea, either as a dairyman or a beef producer, in the state of Wisconsin, that can produce either class of cattle to make money and to pay out. If you are a dairyman and propose to be a dairyman, study these dairy breeds, because you can get a great many more dairy animals out of them than you can get out of beef breeds, but if you are bound, like many of our Wisconsin farmers, to produce beef and butter, then you better get the idea that my friend Adams got over in England, and work it out on that line.



# CARE OF MILK.

**F. H. SCRIBNER, Rosendale, Wis.**

The care of milk from a business or money standpoint seems to be little thought of by the average milk producer, judging by the condition in which it is received at many of our creameries and cheese factories. A large proportion of the patrons who are finding fault with their manufacturer do not realize that the most trouble is at the farm end, and many seem to think if they can only get the milk delivered before it gets sour their duty is accomplished and they wonder why it is that their butter maker does not make an article that brings the highest quotations. A really fine article of butter cannot be made at any creamery until the patrons realize that to deliver poor, tainted milk is to steal from the creameries and their fellow patrons. The quality of the butter determines the price received for it and we all know that poor milk makes poor butter. The market quotation today for creamery butter is eighteen to twenty-eight cents, a variation of ten cents per pound. This is probably more difference than the average creamery has, but we will suppose it is two cents, then with the farmer keeping twenty cows, making an average of three hundred pounds apiece, there is a profit of $120.00, and it seems to me a man could afford to do quite a few extra things for that amount. But this is not all. Do we realize that there is no article of human food that will absorb odors as readily as milk, also in which they can be so easily detected?

How ridiculous it is that for the shiftless ways in which we farmers handle our milk, inventors have had to go to work and invent pasteurizers and sterilizers to try to cover up the so-called "cowy" odors and flavors which we have allowed to enter into the product. Did you ever taste milk that had been treated with one of these machines and notice how destitute it was of that nice, delicate milk flavor tnat we get in milk that has not been contaminated with bad odors and filth? There is no way known to clean dirty milk. How much better then to try to handle it in such a way as to preserve this desirable element in its natural form, not only that, but any artificial means of preserving milk lessens its digestibility, whether by the use of preservatives or the cooking process.

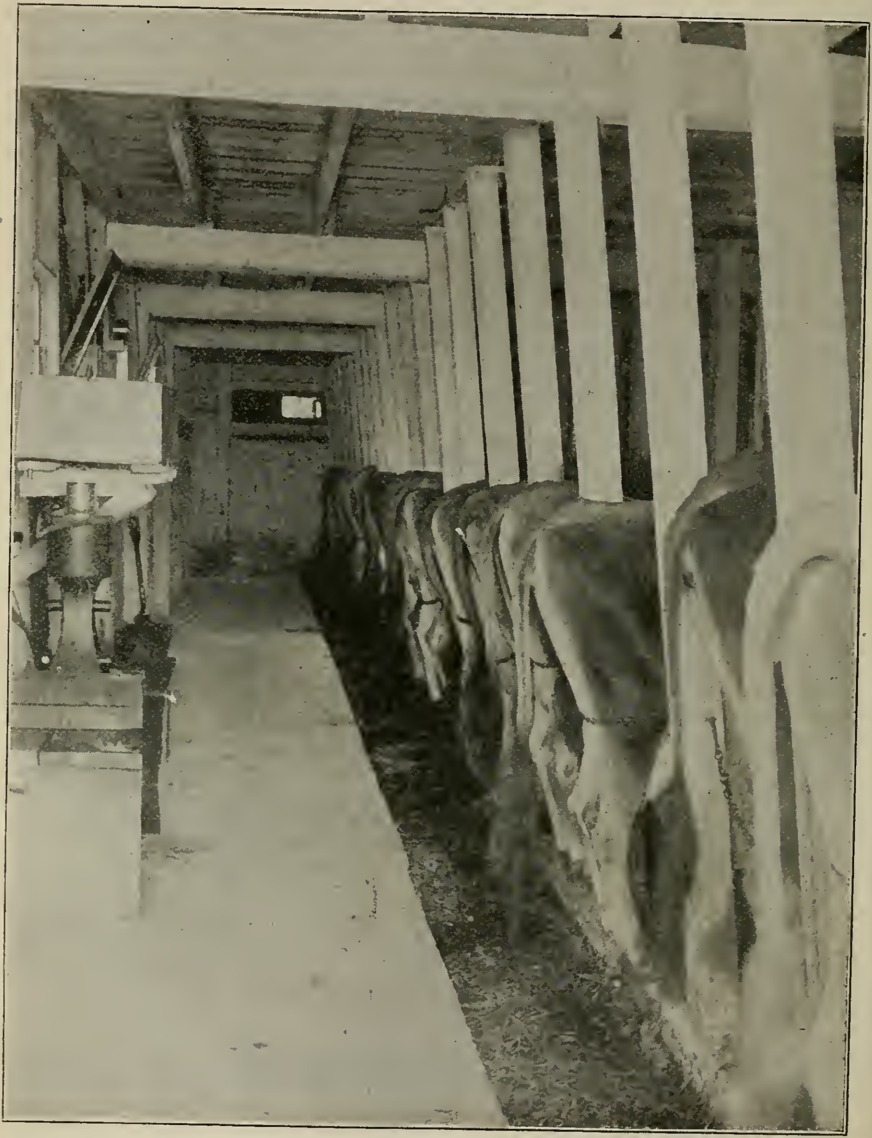
### Some Essentials for the Production of First Class Milk.

The first essential for the production of good milk is healthy cows. A first-class article of milk cannot be depended upon from a. cow with a weakened constitution. The office work of the lungs in purifying the blood for the manufacture of milk is in such close connection that it gets too near the danger line to use the milk from a tuberculous animal.

Next, the milker should be in perfect health. Germs of disease are thrown off in the breathing and coughing, and epidemics have been known to start in this way. His breath should also be pure and sweet and not contaminated by the use of tobacco.

Feeds of all kinds should be sweet and free from must and any abrupt changes in the feed avoided. A great deal of undo criticism is made as to silage feed, but I am sure that where it is made a part of a ration, with other feeds in proportion, the flavor of the milk will be benefited.

Another neglect on the part of us farmers who have large water tanks



Interior view of F. H. Scribner's cow barn showing Drown stalls, cement floor and milk separator.

for cattle to drink from, is we are often careless about cleaning them often and allow them to go so long as to get green and slimy and of a very strong odor.

It is one of the most difficult things in dairy management to secure cleanly conditions in a cow stable. About ninety-nine out of every one hundred are not what is called sweet and clean and the offensive odors contaminate the breath, the blood, and the tissue of the animals and consequently a first-class article of milk cannot be produced. The barns should be dusted often and whitewashed at least once a year, not only to give them a good appearance and make the stable lighter, but to purify them and kill any germs of disease that may have collected on walls or ceilings. Whitewash is one of the cheapest disinfectants known and should be a part of the routine practice each year, and by use of a small fruit spray pump the work can be accomplished much quicker and far more effectively than when applied with a brush, as it can be driven into every crack and corner. The lime should be thoroughly slacked and strained through a fine wire screen or cloth and made thin enough to work nicely through the nozzle. A half bushel of lime will make about thirty gallons of whitewash. This should be used while fresh, as it loses its power to kill germ life after standing.

### A Model Dairy Barn.

A novel banquet was held at the time of the Illinois State Dairymen's Association, in the dairy barn of the Illinois College of Agriculture. Their stable is arranged similar to the stable at our barn at Madison, two rows of cows facing each other, with a space of about sixteen feet between stalls. Here a long, well-decorated and laden table was spread for their guests. The floors, walls, and ceilings were perfectly clean and the cows groomed to perfection. The absolute cleanliness and absence of any odor was the universal remark of all the guests. This goes to show what can be done with a little care and pains.

### Influence of Cleanliness.

Now, to me, aside from the cold side of dollars and cents, there is a satisfaction that comes from keeping things in a neat and tidy way that more than pays for the extra labor we expend, and there is a growing demand for the products of herds kept under these conditions.

Nothing has a greater influence on milk and its production than cleanliness and for this reason the milkers' hands and clothes should be kept clean and void of any disagreeable odor. Also the cows must be kept clean and not permitted to lie in the filth. For this reason some of the patent stalls are almost absolutely necessary for the adjusting of the stalls according to the length of the animal, and obliging her to drop all dirt in the trench.

### Proper Handling of Utensils.

After all it matters little how much care we take along this line unless the utensils are handled right. A rusty can or pail should be discarded, because it is impossible to clean them as they should be. As convincing an argument of the existence of bacteria would be for every farmer to take a good, strong microscope and then collect some of that dried yellow milk on the inside of the cans or pails and place it under this magnifier and see the multitude of hairy-backed fellows that exist there and which are the cause of a great deal of trouble in milk. I had the tinner solder up the seams around the ears and top of the last milk pails I purchased. It makes them much easier to clean and besides they are a great deal stronger and I consider this outlay of five cents the best investment I have ever made.

Too much pains cannot be taken to keep the milk in an untainted, sweet condition. In washing the cans and pails, first rinse with luke-warm water, then take warm water and gold-dust, or some good grease expeller, and a small scrubbing brush, and give them a good, thorough scrubbing. A brush is far better than a sponge or rag, as the bristles will enter every corner and crease and remove everything that is collected there. Then scald with a plentiful amount of hot water. This ought to remove all germ life and put the utensils in a wholesome condition.

Now, while a good deal has been said about the importance of keeping utensils perfectly clean, not much is usually said about the cloths and brushes that are used for washing these utensils. Extra care should be taken to keep these in a clean condition, as they make fine breeding places for microbes.

### The Best Can.

The best can for carrying milk to the factory is the eight or ten gallon shipping can, with small top. The large, straight-sided can, holding one hundred or one hundred and fifty pounds, with a cover that slides down into the milk, ought to be discarded. The cover soon gets out of repair and perhaps a cloth has to be substituted to keep the milk from slopping, which is almost impossible to keep in a sanitary condition, and besides, in going to the factory the filthy dust of the roads rises and falls on the cover to be mixed with the milk. All cans should be covered with a clean canvas to keep off dust and extreme heat and cold.

### Aeration.

Aeration is essential for cooling and to remove animal heat and odors. In an experiment where milk was allowed to stand two hours without cooling, it contained twenty-three times as many germs as when milking was finished, while that which was cooled to fifty-four degrees had only four times as many at the end of two hours. This shows the importance of quick and thorough cooling. Aeration should be done in some good clean place, away from any foreign smell.

### The Strainer.

About as good a strainer as I know of is a double one, the top being made of perforated metal, and beneath this cheese cloth about four thicknesses. This cloth can be kept in good condition by washing and boiling.

### Results of Proper Care of Milk.

Now, there are a good many up-to-date milk producers in this state who are producing pure, sanitary milk and cream and are getting prices far ahead of those who are going along in the old, slovenly, slip-shod way, and really it takes but little longer to do a thing as it should be done.

I expect some day that inspectors will be appointed for the purpose of going around and looking after us fellows and if they find that we are not producing an article up to the sanitary standard our milk will be condemned and we will not be permitted to put it on the market until proper conditions are met. How much better then for us to forestall this event and furnish an unquestionable article rather than be compelled to by force of law.

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## DISCUSSION.

Question—What pump do you use in whitewashing?

Mr. Scribner—I have a little spray pump and use an ordinary kerosene barrel, I set this pump on the barrel. It costs about $5.80, and it is one of the best things we have on the farm; we whitewash our whole barn and the hen houses and hog pens and every part of the farm buildings. We mix it thin so it will spray nicely, and it drives it into every crack and corner, making the job more effectual than where applied with a brush.

Prof. Carlyle—There is a very successful whitewashing machine manufactured by the Ripley Hardware Company, a three-gallon tank, etc.

Question—How should a cow be prepared for milking so that the dirt will not get into the pail?

Mr. Scribner—In the first place, she should have a stable so arranged that she will not be allowed to lie in the dirt. Then we brush the udder, we never have any dirt on our cows. I dare say they are cleaner than the horses are. We remove all dirt and straws from the udder.

Question—Do you curry the cow?

Mr. Scribner—Sure we do, at least twice a week.

Question—In shedding time, aren't you apt to get hairs in the milk?

Mr. Scribner—Oh, yes, a few. I think every man who keeps cows ought to keep a clipper. We clip the cow's tail and the long hairs on the udder, which helps to keep the hairs out of the milk.

Question—You do not wash the bag?

Mr. Scribner—We do not, we brush it instead.

A Member—I would like to see some legislation enforcing this throughout the state.

Question—Would you advise putting lime in the water tank?

Mr. Scribner—No; I have heard that it will keep that green scum down, but it won't with me.

Question—If you have a tank tightly covered, isn't it a good thing to shut it down in the heat of the day?

Mr. Scribner—No, sir. I have probably as ideal a tank as anybody could have. It is made out of cement and holds about ninety barrels. It is cheap and is probably everlasting. It has stood the last two winters without a crack. It is all covered, except one long strip on the side where the cows drink. It is eighteen feet long and we have eighteen feet of surface for drinking; there is a roof over it for shedding off the water, keeping out the dust, etc.

A Member—I built a roof over my tank four years ago and I never have had a particle of green scum.

Mr. Johnson—I think it is a mistake to try to have a large tank. I think the running of the water through the tank clarifies it and stirs it up. We all know that where we use the old fashioned well, dipping it up with buckets, we get much better water than where it is pumped.

Mr. Scribner—A man with fifty-five or sixty head of cattle has got to have a supply of water on hand.

Question—What kind of a stall fastener do you use for your cows?

Mr. Scribner—We have a patent stall, called the Drown stall, and we like it. The principle of it is to regulate the cow, to keep her clean. They can be made for about $3.50, above the floor.

Question—You had to pay a royalty on the patent?

Mr. Scribner—I had to, I guess everybody will. The $3.50 includes the royalty. These men who are kicking against paying a little bit of royalty are cutting off their noses to spite their faces, a cow will pay for the stall every year in the comfort she gets, and the satisfaction we get in having a nice, clean cow is worth a whole lot besides.

Mr. Foster—Do you brush your cows' udders except at milking time?

Mr. Scribner—We never touch them until just before we sit down to milk. I don't think we should touch the udder before that. I know some people go on and clean all the udders at once, but I think they make a mistake. It has a tendency to start the milk coming down and we should be ready to take it.

# FAIRS.

Supt. GEO. McKERROW, Madison, Wis.

Agricultural fairs have been at work for many years in their present form, being an outgrowth of the old English sale or stockday fairs. Great Britain leads the world with her Agricultural fairs and they are true to the name. If any change in the title of the English show is to be made, it should be "Live Stock Show," because live stock predominates, followed by the agricultural machinery and dairy departments. All side-shows and other entertainments are barred. The fair seems to have an interest for all the English people. I have seen the ladies and gentlemen of Royal and titled birth stand beside cattle, sheep, swine, horse and poultry rings for hours along with farmers and their wives and day laborers, watching with the greatest interest possible the placing of the awards and discussing the strong points of the winners and the weak ones of the vanquished. On judging days a double gate fee is charged, usually equivalent to one dollar in our money. This practical education of the eye at British fairs has made her famous the world over for the best breeds of live stock, breeds that have added millions to her own exchequer and even more to accounts of the countries that have used this good blood to build up their herds and flocks.

Shire and Clyde horses in the ring at Wisconsin State Fair of 1903.

This improvement from British

breeds of live stock has been of untold value to our own country and Canada has patterned very closely after her mother country in her Agricultural fairs, until the Toronto Industial is known the world over.

### Some Evils to be Corrected in Wisconsin.

The great state of Wisconsin is well up with her sister states in this matter and yet there is a wide field for improvement. Our state is in many ways very liberal in building up these practical annual schools of agriculture, in some respects extravagant and in others parsimonious. After thirty-five years' experience as exhibitor, patron and manager of such shows, I am convinced that a change is needed, both in state aid and supervision and in the general plan of management. It might not be best to make this change a radical one, but gradual.

At present two plans of state aid are in vogue. The State Fair and two districts fairs each receive a special appropriation and ten per cent. of premiums paid, while county fairs receive forty per cent. of premiums paid, and not over $1,200.00 to be paid to any one county fair. I believe all these fairs should be put upon the same forty per cent. plan, without any limit to the amount paid to any fair.

A prize Holstein herd at Wisconsin State Fair of 1903. Owned in Iowa.

With many of our people, and in fact with many fair managements, there seems to be a general misunderstanding of the purposes of the fair. This misunderstanding seems to be that a fair is simply to furnish amusement for the people that attend, or, in other words, it should be a big circus and theater combined. The state in its appropriation of money to aid in the holding of fairs, takes a different and correct view, that is, that a fair is strictly an educational institution and I am pleased to be able to say here today that state fair managements at least are coming closer and closer to this latter and correct view of its purposes and in many states the appropriations made are limited strictly to the payments of prizes on live stock and agricultural products, as is the case in Indiana, where $10,000.00 as an annual appropriation goes to the state board for this purpose alone. All the best state fair managements deplore the fact that to get out paying crowds they have to pay some attention to the amusement side of the show, which always detracts from its educational value. You can all count up a number of fairs that you have seen wrecked by managements that have catered too much to the entertainment idea, as given in expensive races and other so-called special "attractions."

Some Prize Aberdeen Angus at Wisconsin State Fair, 1903.

Some county fairs spend all their money on the horse races and thus neglect the agricultural and live stock interests. Others deduct five, ten or twenty per cent. for entries and collect forty per cent. from the state on the full amount, thus defrauding both the exhibitors and the state. Many of our fairs still sell privileges to side-shows and so-called entertainments to draw the attention of the people from the useful and educational features of the fair, thus minimizing the benefits of the show.

## Value of Judging Pavilions.

Better facilities for the audiences to inspect the judging of live stock should be provided. In 1896 we held a judging institute at the Waukesha county fair, which was voted a great educational success. This movement has been followed up by a few fairs, but only one in Wisconsin, that I know of, has made a permanent provision for this feature by building a live stock judging pavilion, and that is Marathon county. The state of Illinois, in 1901, built a $38,000.00 live stock pavilion and Iowa followed in 1902 with another at a cost of $43,000. We are modestly asking the Wisconsin legislature for $25,000.00 for such a pavilion, but have just been told by the joint committee on claims that we cannot have it this year.

We trust that future legislatures will take hold of the question of fairs and by a re-arrangement of the laws, improve our entire fair system in such a way that state and county fairs can better come up to the educational standard so much needed, by providing better buildings to house the best animals and products, proper judging pavilions, good walks and roads, so that fear of rain will not so completely discourage alike fair goers, fair managers and exhibitors.

## DISCUSSION.

A Member—We feel it quite strongly in our town with fairs on each side of us that we have to come in competition with, and we are not put on a level so far as state aid is concerned.

Supt. McKerrow—We find some counties holding four fairs; all four of these fairs drawing pay, that is, state aid Some counties hold only one, and some none. For instance, as I understand, this county hasn't had any fair in some time. This county is helping to pay the state taxes and yet their money has been going to four fairs in Outagamie, and to three in Grant, and two in many counties that I know of. Of course, as one of the officers of the state board of agriculture, I would agree with you that every State Fair should have aid on an equal footing, but they are not getting it. The fair at

Brown Swiss Herd at Wisconsin State Fair, 1903.

Chippewa Falls is getting a special appropriation, the fair at La Crosse is getting a special approriation. It is rather a vexed question as to where we are going to draw the line.

Mr. Bradley—There is another vexed question we find in some of the county fairs. The fair will put up a premium list, say $5,000.00, very large amount, and they will charge the man who enters stock fifty per cent. for an entrance fee. If he wins a premium of $5.00, the Fair Association keeps back $2.50 and gives the man $2.50, and represents to the state that they have paid $5.00 instead of $2.50 and draw forty per cent. from the state, so that the fair is really paying out only ten per cent., and that is hardly right. Some other fairs are paying the full premium.

Supt. McKerrow—Wherever any money is kept back in that way, whenever any percentage is deducted from the premiums, or deducted in case of bad weather, or anything of that kind, it is unfair to the exhibitors, unfair to the other counties that are drawing state aid, unfair and unjust to the state; that is where our state has been making a mistake and there ought to be a line drawn. So far as they can cut money off in that way and still charge the state forty per cent. for county fairs, it should be looked into. We have been looking after them a great deal better within the last year. It is only four years ago when street fairs in some parts of the state came in and claimed and got state aid, but that is cut off, we are doing better.

Shorthorn Bull Calves in Wisconsin Class at State Fair, 1903.

Question—How would it be if you charged the same entry fee as with trotting horses?

Supt. McKerrow—You wouldn't get the exhibits.

A Member—I have attended fairs

where they did that and we had better fairs than where they cut off twenty-five and forty per cent.

Supt. McKerrow—Oh, yes; but neither of those principles is correct, and the fair will go down that follows either one of those plans. The correct plan is to offer what you can pay and pay no more, and then pay everything you offer; deal honestly with your exhibitors and the state. I rather like the plan of the Walworth county fair, one of the most successful fairs in the world of that class today, and that is to charge a dollar entry fee for every exhibitor that comes in and then make that man or woman who pays the dollar entry fee an annual member of the Association, with a vote. This practice has welded together the people of Walworth county as a unit in support of their fair more than anything else.

Question—They have to pay that dollar every year and enter anything they have a mind to?

Supt. McKerrow—Yes, it is an entry fee, and it is also a membership of a dollar. You can drop out a year or two and then come in again, if you want to. You are entitled to enter anything you choose in any and all classes, and you have a right to vote at the annual meeting. That has been going on for twenty or twenty-five years, I don't know but thirty.

A Member—What killed the fair in this county was the exclusion of the farmers. It went into the hands of horse jockeys, and they did not pay their premiums at the last fair in this county.

Question—Don't you think the district fairs will kill the state fair?

Supt. McKerrow—That is a hard question to decide. I don't think they

Three prize Hereford bulls representing Wisconsin and Missouri at Wisconsin State Fair, 1903.

are much detriment to the state fairs on the whole. I believe that if you educate the people up to going to good county fairs, it makes them anxious to go further to the state fair. They will say, "I have seen a good deal here, but I can see a good deal more at the state fair," and the same process is true with the exhibitors. The man who takes two or three animals to the county fair and makes a success will launch out and take a bigger bunch of animals to the state fair.

Prof. Carlyle—In Canada they do not allow any state aid to the district fair. The county fair gets something, I don't know how much. I have visited a great many fairs in the past five years and I want to tell the people of Wood county that, barring Walworth county, you have in your sister county of Marathon, a fair that is in some respects ahead of Walworth even and in all respects I think it is only second to Walworth county. The first time I visited that fair, I think there were only two herds of pure bred cattle in the county, and those were both owned by Mr. Rietbrock and were not on exhibition. The stock that was exhibited there was grades and common stock of a pretty low order. The people in charge of that fair were very anxious to have a good one. They kept after Professor Henry until he consented to send up our exhibit of sheep from the university farm. They went down and subsidized a breeder of Red Polled catle. They went too and subsidized a Shorthorn breeder to bring up his herd of Shorthorns. They had our shepherd there a week talking to Germans until they were crazy about sheep, and I talked until I went dry.

Year before last, the following year, I found three herds of Red Polled cattle, two herds of Shorthorns, I think two of Jerseys, one of Guernseys, and three flocks of pure bred sheep. That was the result of one year's work that brought these large contributions to the fair. This last year, the county fair built a stock judging pavilion, the first I think in the state, even Walworth county hasn't one. The Marathon county fair has a nice covered pavilion, where the people can go and sit down and watch the judging of stock and listen to the remarks made, and they insist on the judge giving a reason for every decision he makes, and if he can't give it he has no business there. I find it isn't safe to be there otherwise. That is the most educational feature of the fair, and the race track isn't in it. They call off the races when the judging is going on, they can't get anybody to go and look at them. I believe if the fairs will make some effort to get in these educational features where people can learn something, they will be successful. If our fair managers will pay more attention to the educational features, interest the farmers in the judging of stock and get a judge who is competent, and make him tell why he thinks so and so, the fairs will be more successful.

Recess till 1:30.

# AFTERNOON SESSION.

The Institute met at 1:30 o'clock. Mr. C. P. GOODRICH in the chair.

## CLOVER.

**GEO. B. McGILVRA, Baraboo, Wis.**

Mr. McGilvra.

Of all the plants found on the farms of our country none has a greater value than clover. As a feed for all kinds of farm animals it is nearly a perfect ration. Where it came from we will not stop to inquire.

I have heard of clover-sick lands, but think there is more land sick for want of clover than from an overdose. It is a fact that of the grass and seeds used in their natural form as food for the human or animal families, clover contains a greater proportion of nitrogen than phosphoric acid or potash, while the grasses and other roughage contain less nitrogen than phosphoric acid and potash. It is also a fact that the average virgin soils have a smaller nitrogen content than of the other elements necessary to a successful plant growth, and the greater proportion of these elements are found in the twelve inches nearest the surface. Now, as our early farm operations were given to the growing of grain for market, it is easy to see that we were constantly selling our farms, or, in other words, they were becoming less fertile. How can we retain this fertility, or restore it if lost?

### How to Retain Soil Fertility.

Either by feeding the products of our fields to the farm animals, carefully returning the manure to the land, using commercial fertilizers, or by growing some crop that can produce itself without exhausting the soil. Such a plant is clover.

Until quite recently it was a disputed question as to whether clover had the power to gather nitrogen from the air. It was known that clover contained a large per cent. of nitrogen. It had also been proven that a field after producing a crop of clover was more fertile than before and these facts, coupled with the one that the air was four-fifths nitrogen, led some to think that perhaps clover could and did gather part of its nitrogen from the air. Our best authorities are now agreed as to this, and we can readily understand why clover is so desirable a crop to grow.

Nor is trapping nitrogen from the air the only way clover has of securing fertility that would otherwise go to waste. Its roots, forcing themselves deep ino the sub-soil, gather and force back to the surface fertility that has been washed down by the rains or melting snows. In well-drained soils, the roots have been traced to a depth of eight feet. And this is not all. Their roots, by penetrating the lower strata of soil, have in a measure done the work of the sub-soil plow and we find the land warmer, dry, and in a much better mechanical condition, owing largely to the humus left by the decaying plant.

Many of us remember how, in an early day, our land did not require near the labor to prepare a fine seed bed that is now necessary. This is owing to the lack of humus in our soils. Another fact that should not be lost sight of is that soils containing an abundance of humus do not wash so badly and nothing will bring about this condition better than clover grown in short rotation.

The value of the fertility in a season's crop of clover, as given by different authorities, varies about as much as a story told by as many different persons, but ranges from $20.00 to $70.00 per acre. This is reckoning the nitrogen, phosphoric acid and potash content at market prices. Compared with average barnyard manure, a crop of clover that would make two tons per acre is equal to ten tons of manure.

Experiments in America and England have proven that more nitrogen is left in the soil where the second crop has ripened a seed crop than where the second crop was cut for hay or fed off. Also that a better wheat crop can be grown on a field from which a crop of seed was taken the preceeding year than if the second crop was plowed under for manure. An inverted clover sod makes an ideal seed bed for any crop, especially potatoes.

### Seeding.

The time for sowing the seed and the amount per acre must be governed somewhat by circumstances. We used to grow winter wheat and rye to seed with, but of late have been obliged to drop the wheat. Many still sow grass seed in March, trusting to the thawing and storms to do the covering, but for several years we have waited until the ground was fairly dry before sowing and followed with the harrow, preferring one not too heavy and with fine teeth. No harm will be done the grain and with us better results have followed.

If sown with spring grain, we prefer wheat or barley. The wheat does not shade the ground so much as the other spring grains and the season of growth for the barley is short, thereby giving to the young clover the sunlight and moisture it so much needs. We have not had good success seeding with oats, as they are apt to lodge and smother the young clover.

Last year we seeded one field, using about one an one-half bushels of oats per acre, and had good results. We also seeded a field, sowing the usual amount of oats per acre, and cut for hay when nicely headed. We secured a fine stand in this case, but 1902 was an exceptional season.

If sowing clear clover, I would advise using about six quarts per acre. A mixture of medium red and alsike would give a better quality if clover hay was needed. If timothy seed is to be sown, we use about four quarts clover and two of timothy.

### Varieties.

As to varieties, we have grown the mammoth red, the medium red, alslike, and have about two acres of alfalfa, sown last spring, which went into the winter in good shape.

If my ground were of a sandy nature, or if I wished it for pasture or to plow under for manure, I should sow the mammoth. In moist lands alsike does well, is very hardy, makes a better quality of hay than the reds, but is more difficult to cure and makes but a scant second growth. Alsike and red top make a find combination on the proper soils. Alfalfa in Wisconsin is but little known, but from reports it is a desirable variety; however, I would not advise sowing largely until more is known regarding it.

### How to Treat Young Clover.

As soon as the grain is stacked, we clip our young clover. Setting the knives as high as possible, we run the mower over the young clover. This is to check the upward growth and cause it to stool or thicken, it also prevents weeds, if any, from going to seed. The clippings are left on the ground for a mulch. We have had clover that at harvest time was quite thin on the ground, which, after being thus treated, would thicken so that before winter it was a perfect mat.

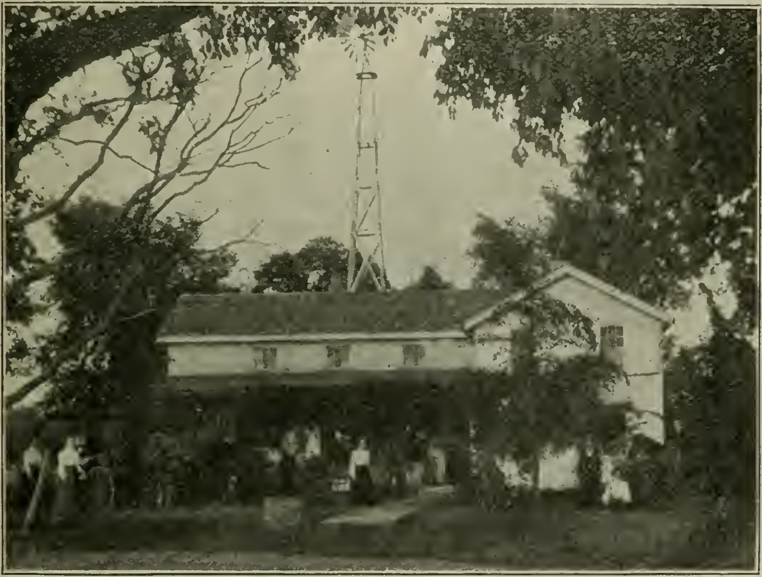
We have been severely criticized for this treatment of our young clover, but have never seen any bad results and have received much benefit, and until it is clearly demonstrated that we are standing in our own light shall continue, though always ready to listen to advice or criticism.

### How to Make Clover Hay.

We are often asked how to make clover hay. The term will admit of comparison, which would be about as follows: fair clover hay, good clover hay and perfect clover hay.

Fair clover hay would be made about like this. The clover should be in full bloom, or a little riper. Mow when convenient, leave it to dry on the ground, rake and draw in. This is perhaps the cheaper method, and is the one I was taught. The quality of the product is better than timothy, provided no rain fell during the process.

The method I have followed for sev-



Farm Home of Geo. B. McGilvra.

eral years and which I am fairly well pleased with is as follows. The clover should be in full bloom. I mow in the afternoon if possible. The next forenoon, after the dew is off, we use the tedder, going over once and if very heavy perhaps twice before noon. The clover at this time is not dry enough so that the leaves will be broken off by the tedder. It is left in a better shape to cure than the mower left it. In the afternoon we rake and bunch, making bunches of about 150 pounds. In bunching hay, we throw two dumps of the rake together for a foundation, then pitch onto this foundation, lifting each forkful and placing it on top in such a manner that it will settle down like a cap or roof. These are left until the dew is off the next day, when they are opened. In doing this, we do not tear them apart much, but taking the top invert it, then as each forkful is taken off invert or leave on edge, being careful to get what was next the ground. In the afternoon we draw in, being careful in mowing to keep it level instead of piling in the center and rolling each way. We have followed this plan for several years with good success. By this course the hay is secured in about forty-eight hours from the time it is cut.

Hay cut before the period of full bloom is more digestible than if cut later, it is also harder to cure and must be handled differently, but where the acreage is large we must begin sooner or lose much of the feeding value. In this case, I would mow in the morning, rake and bunch in the afternoon, and leave in the bunch for several days. The after treatment would be the same as before. By this method the quality will be about perfect, if the weather has been favorable, but we must bear in mind that if we have followed up our work closely, that before the first cut is in the barn we will have considrable cut and in the bunch.

### Winter Killing.

The great draw-back to growing clover is winter-killing. This can partly be avoided by top dressing early in the winter, a light dressing, even, will keep the frost in, so that the early spring thaws do not affect it. In driving several hours recently in southern Wisconsin we saw but three fields where there was any clover in sight. So uncertain is it that many have ceased sowing clover, while in north central Wisconsin I am told winter-killing is unknown. Certainly as farmers their lines are cast in pleasant places, for the farmer who is reasonably sure of a clover crop need have but little fear of coming to want.

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### DISCUSSION.

Mr. Goodrich—In the Farmers' Institutes in other parts of the state, they are always asking, how can we get a catch of clover? You don't have to ask it so much in this part, but that is a good question to answer.

Capt. Arnold—I have been in the habit of sowing two and a half bushels of oats broadcast to the acre. Last year I bought a disk drill and drilled my oats north and south, and put a bushel of oats and spring wheat to the acre and had about sixty bushels to the acre, and I got an excellent stand of clover. My idea was to have open rows running north and south, so as to admit as much as possible of the sun, and for a long time the clover has a good chance to get the sun and air. I shall put in a bushel and a half to the acre this year, and I believe I shall get as much as if I sow two bushels broadcast.

Mr. McGilvra—I use a drill for sowing all grain.

Capt. Arnold—There is another thing. I used to raise hops and you know you couldn't sell the hops to the brewery men because they had lost their flavor. Now, the main thing in any article of diet is to have it a good flavor, and if the clover is cured in the cock or in the shed it will have a fine flavor. Did you use hay caps in curing clover?

Mr. McGilvra—No, I never have used them. I would use them if I had them. One of my neighbors uses them and they are all right.

Capt. Arnold—About what stage of dryness is this hay when you rake it?

Mr. McGilvra—Well, it is mowed in the afternoon lying over night; it is not dry enough so the leaves will break off much, if any; it is green enough so you can take and twist it and it won't break, it is just about fairly wilted, the moisture has gone out some, but it is not dry so it will rattle. I don't want my clover hay to rattle when I am pitching it around.

A Member—I have raised clover hay in this country and if you cut it in the afternoon the next morning it will be in the same condition as at the time it is cut it is so heavy. It will cure about three tons to the acre and especially alsike.

Mr. Jacobs—Don't you think it would be better to let that lie there a day or two before opening those cocks?

Mr. McGilvra—I want to cure it without taking any chances on the weather. Of course if the weather is all right you will get better hay.

Mr. Jacobs—We think we will take our chances and get the better hay.

A Member—I think that is a good point in the paper about clipping clover. I know of fields that have been greatly damaged by growing up so rank and smothering out in piles where they were rank.

Mr. McGilvra—I have practiced clipping for ten years with good success. I have had fields where at harvest time the clover is quite thin but this clipping causes it to stool or thicken. The claim is that there will be just as much weight in that clover plant below the surface as there is above. We grow the clover partly for fertility and partly to put humus in the soil. Even if we know that clover is going to winter-kill we want to get as much of the humus growth as possible and if we allow it to form one spindling center shoot we won't get a great deal.

A Member—I have clipped even in a very dry season. and it didn't hurt it.

Mr. McGilvra—Another point, if there are any weeds growing in your field, you get rid of a good many weed seeds by the clipping. I am satisfied that my farm is getting cleaner every year on account of this practice. My spring grain is put in with a disk, without plowing, and I do not have many weeds in the grain field.

Supt. McKerrow—Alfalfa is not clover, but I want to ask if you have had experience with alfalfa?

Mr. McGilvra—Only from last spring's sowing. I sowed about two acres last spring. So far I think it is all right.

Supt. McKerrow—Did you clip it back last summer?

Mr. McGilvra—Yes, I clipped it twice; the first time a little below the surface, in cutting oats off that field for hay, they were lodged so badly I had to set the mower right down. I thought I had destroyed the alfalfa, but I had to clip it again.

Supt. McKerrow—Are there any farmers in the audience who have tried alfalfa? I see four hands. Mr. Stone, how many crops have you cut?

Mr. Stone—I cut two seasons, three crops each season, both very dry seasons. I think it is far better than the red clover for the average dairyman.

Supt. McKerrow—Any other gentleman who can give us any experience? This alfalfa question is practically a new one.

A Member—I made a total failure of it. It died out the first summer.

Supt. McKerrow—Did you have a nurse crop with it?

The Member—I had oats with it.

Supt. McKerrow—They nursed it to death, I suppose.

A Member—I sowed mine with oats and pastured a calf on it and the calf did well. It appeared to me very healthy and green.

Prof. Shaw—I would like to ask the gentleman who succeeded in growing alfalfa, exactly what kind of soil and subsoil he has. That is the all important question in growing alfalfa.

Mr. Stone—We have a very thin soil, that is, the gravel is quite near the surface, but we have a hardpan before we get to the gravel, what I would call a clay subsoil. Our soil is not sandy soil or clay soil, it is burr oak openings, it can be termed clay loam, or loamy clay.

Prof. Shaw—What you call the hardpan did not come near the surface, did it?

Mr. Stone—In some cases it is not more than a foot and a half from the surface. It seems to be a red clay and gravel mixed.

Prof. Shaw—Can you dig in it with a spade?

Mr. Stone—Oh, yes. It is pretty hard digging, especially in a dry season.

Prof. Shaw—My conviction is, gentlemen, that the soils for alfalfa, if they are in the alfalfa country, are entirely different from the soils for alfalfa under Wisconsin conditions. If I know anything about the soils for alfalfa under our conditions, the best soils are the soils that are termed loam soils, with probably a little sand in them. The great matter is to have a clay subsoil that you can dig into with a spade. I believe anywhere, if you have that kind of a subsoil, you are going to get alfalfa.

Mr. Goodrich—In Jefferson county, there are a good many who within the last three or four years tried alfalfa, and it apparently is doing well. Governor Hoard has now got twenty acres of it on his farm. I know another man who has twenty-six acres, and where it was put in in good condition and the nurse crop did not grow so big or lodge down so as to smother it, it has been doing well; they have got from three to four crops a year, and in one instance, where the land was excellent, the four crops yielded six tons of hay to the acre that was pretty well cured in the field. This spring there will be very few farmers but what will try some to see how it does.

Supt. McKerrow—Some six years ago we first grew alfalfa sucecssfully. Twenty years ago we grew it successfully, but six years ago we began to grow it with more success than we have had with clover since. I believe that the soil has a good deal to do with it, and yet we are growing it on a very heavy clay subsoil that had been pretty well clovered and the subsoil had been broken up somewhat with clover; it is pretty hard digging with a spade yet, out the alfalfa roots have dug it all right. The principal thing in my own experience and observation in getting a good strong root that will stand our winters, particularly the first winter, is, first, in having the land thoroughly rich so it will grow it quick, second, and I guess the most important, is clipping the alfalfa back several times. I think I would begin to clip it as soon as it is big enough to clip, and do it again when it gets three, four or five inches high, and be sure to clip it just as quick as you see yellow leaves on it. Then you will get a root that will stand the next winter all right. Clip it close to the ground, not under the ground, as Mr. McGilvra did.

Mr. McGilvra—I didn't clip it under the ground from choice, but I had to get that oat crop off. I examined my alfalfa last Saturday and Sunday and I think it has wintered all right. If anything, it has wintered a little better than the red clover.

Prof. Carlyle—This matter of clipping back alfalfa is one that is interesting us at the Station, and I want to say something about a system we have followed for the past three years in getting a catch of clover. In dry seasons, we have had a great deal of difficulty in getting a catch of clover, but for the past three years we have practiced seeding our clover with oats, and pasturing the oats off and letting the cows and the sheep and the calves do the clipping of the clover, and Professor Henry says we have never had as good a stand of clover as in the past three years. When the oats are up about six or seven inches high, we turn in the cows and hogs and sheep and calves. We have to be careful about keeping them off in the extreme hot weather, but during all last season the very best pasture we had on the farm, the pasture which made our cows milk best, was that oats and clover pasture, and we got more pasture off of it per acre than we have simply sowing thickly with oats, seeding with clover, and we have a pasture the entire season.

Prof. Shaw—I have advocated this system a half a dozen years in Minnesota and in parts of Dakota, where they attempt to grow clover, and so far as I can learn, the very best stands were obtained in that way, although they might have been grown in addition to oats or sown probably with oats and wheat, or oats and barley, anything that will make good pasture for the cattle, and the trend of testimony is that a stand can more surely be gotten that way than by simply sowing with an ordinary nurse crop.

Mr. Johnson—I have had experience of about thirty-six years with clover, and the best crop I ever raised was sowed with rye, and the rye cut off and then pastured instead of clipping back, we pastured it because the rye was badly lodged, and we got fifty-six bushels of rye to the acre. I bought a flock of sheep and they went all over the ground and they ate that clover, and I thought they had destroyed the crop entirely, and in the spring, being a little late with our other work, we let that field stand, and after a little while there were stools appearing all over, and we let things stand and finally cut off a crop for seed, and on twelve acres I had 132 bushels,—twenty-eight pounds of clean seed, and I got $7.00 a bushel for that seed, and that was the best thing I ever did on my farm.

Prof. Shaw—If there is any gentleman in this assembly who has had any experience in growing small white clover for seed, I would be exceedingly glad to have him communicate with me at his convenience. I am satisfied that there are some parts of the state of Wisconsin where that kind of seed can be grown at a profit, and I would like to see any one who is doing that kind of business.

Supt. McKerrow—It has been grown in Washington and Dodge counties to my knowledge. Mr. A. F. Noyes, who is dead, grew it. If there is anybody in the audience who has grown white clover for seed, please raise his hand. Here a gentleman. Now, Professor Shaw, keep your eye on that man from Dodge county.

# DRAFT HORSES.

L. P. MARTINY, North Freedom, Wis.

In speaking of this subject, I wish to treat it from the standpoint of the average farmer, rather than from a breeder's standpoint.

A few years ago, when farmers were all raising a greater or less number of colts on the farm, conditions became such that there was a great over-supply and naturally prices were forced down. We are now confronted with another proposition. The raising of colts is now the exception, rather than the rule, on too many farms and we now have a good and growing market for good draft horses. There are very few farmers in the state who could not raise one or more colts each year and derive profit by so doing.

With draft colts, they can be put to light work on our farms and be useful as well as profitable. By raising a few colts we can sell off the older horses when they get to a marketable age and by so doing keep a young class of horses that are continually improving year by year.

## The Sire.

As in other lines of breeding, the sire is of the most importance as a factor in improving our stock. In the selection of a breed there is little to be said, as there are several draft breeds and they are all good ones and no one breed contains all the good horses.

It would be desirable for every farmer in a community to try to raise the same breed, or the grades of this breed, because buyers will be attracted to where they can find a uniform lot of horses. If the Percheron horse predominates in a certain community, I would not recommend any one to try to introduce Clydesdale or Shire blood, as it would destroy the uniformity of the class of horses in that locality. No matter which breed you choose, the good draft sires of all breeds should have all good points in common.

In general appearance the form of the draft sire should be broad, massive, and well-proportioned, and weigh from 1,700 to 2,000 pounds, depending on the class of mares he is to be bred with. He should possess fine quality, as indicated by smooth bone, somewhat flat in shape and hard, lean, well-defined tendons, and a fine hair and skin. The head should be medium size and lean in appearance, a fine muzzle, large nostrils; eyes should be full, bright, clear and not too small, and well placed; the forehead should be broad and full and should indicate an energetic and good disposition; neck should be well-muscled, high-crested, with a fine throat latch and large wind-pipe; shoulders should be sloping and extending smoothly into the back; arm should be short and thrown back; forearm heavily muscled, long, wide; knees should be wide, clean-cut and strongly supported; canons should be short, lean, flat, with large tendons set back; fetlocks should be wide, straight, and strong; pasterns should be sloping, lengthy, and strong, giving a good spring to the legs and body; feet should be large, even size, with concave soles, strong bars, large frog, wide heel, which should be one-half the length of the toe and vertical to the ground.

In body the chest should be deep, wide, low, with large girth; ribs long, close-sprung and short coupling; back should be straight, short, broad and muscular; loins wide, short, thick and straight. The underline should be long, with flank well let down. In the hind quarters the hips should be smooth and wide; croup wide and muscular; quarters heavily muscled and deep; hocks should be clean-cut, wide and straight. He should be possessed of good action, as indicated by a smooth, quick, long step, and the trot should be rapid, straight and regular.

A ring of two-year-old Clyde and Shire stallion colts at Wisconsin State Fair, 1903.

### How to Secure Good Draft Sires.

When farmers ceased to breed horses a few years ago, there was, consequently, a decrease in the number of sires and since there has come to be a profit in raising good draft horses we are confronted with a shortage of good draft sires.

Where there is no individual man who has a good draft sire and no one can be induced to supply, it becomes necessary to form stock companies and a number of farmers buy their own horse. This is a very good plan, providing the farmers do it themselves and not let some one interested in selling a horse form it for them. As a rule, companies formed by horse salesmen pay from two to three and even four times what the horse is worth.

A better way would be for the farmers to organize themselves and elect a committee to send to several breeding or importing establishments and thus have the opportunity of making a good selection and save perhaps one-half in the purchase price of a good horse over what it would be if he was shipped to a town and a company formed by the horse salesmen.

### Some Qualities a Brood Mare Should Possess.

In the selection of brood mares, choose those that are of the draft type and form as much as possible. Never try to raise draft colts from a trotting bred or coach mare, or a mare that has no draft qualities whatever. When using ordinary grade mares for breeding, try to have them as heavy boned as possible and a good sire will furnish a great deal in the way of size and quality.

Always see to it that your breeding stock is sound, as any defects are liable to be inherited, and if you have a horse that is defective in feet and legs and wind, you almost have no horse at all.

A pair of McLay Bros. prize Clyde fillies as seen at Wisconsin State Fair, 1903.

### Management and Care of the Brood Mare.

In the management and care of the brood mares, the feed need not be different in quality from that fed at other times, only it should usually be somewhat greater in quantity. As to feeds to use, oats are perhaps the best single feed, yet bran and corn silage may be fed with beneficial results in winter, when they cannot get any other succulent food, in connection with the roughage.

The brood mare should get plenty of exercise at all times. It is the nature of the horse to be out in the air and in motion a great deal of the time. Perhaps there is no better way of exercising draft brood mares than to keep them at light, steady work, or, if we have no work for them, as is often the case during the winter months, they should have the range of a large field, or the whole farm would be better, where they get ample exercise and plenty of pure air. Horses may be kept out in this way, even in quite cold weather, without appearing to suffer any inconvenience.

As foaling time approaches, let the feed be loosening in character and do not change the condition of the mares to any considerable extent. If they have been in the habit of working, it is safe to keep them working right up to foaling time.

### Care of the Colts.

If all goes well at foaling time, we should begin at once the development of our colts. Teach them to eat, which can be done when they are from one to two weeks old, by providing a self-feeder where they can get oats at all times, and bran is good in addition. There is never any danger of a young colt eating too much and the colt will be seen at this box many times a day.

In the management of colts, we never allow the colts to run with the mother while she is at work, or on the road, as both colt and mother will worry a great deal for each other, while, if left in the barn, they soon learn to forget each other for the time they are apart and it is a great deal better for the colts, while the mare is more agreeable to work.

Aim to keep the colts growing well and see to it that they are getting a good grain ration and are in good thrift at weaning time. They will then undergo this tax in better shape than if not properly cared for.

Always aim to keep them growing in a good, thrifty condition on feeds that are rich in bone and muscle-making material, but do not encourage a superabundance of fat by feeding carbonaceous foods, such as corn, as this will spoil the best colt.

The first year after weaning is usually the hardest time in the life of the colts and we should give them extra care and feed at this time, as it will effect a saving in the end and develop them into better horses and horses of finer quality.

**Pair of road horses, first at Milwaukee Horse Show, second at State Fair, 1903, owned and driven by Geo. Harding, Esq.**

## DISCUSSION.

Question—What do you think of feeding silage for a brood mare?

Mr. Martiny—It is very good feed, but must be fed in limited quantities. We feed about fifty pounds to seven horses twice a day. Half a bushel for a day would be all right. If you feed too much, it is apt to scour them. It has the same effect as feeding on grass. We always allow them all the dry feed they will consume by way of oats, straw and corn stalks. Of course you should feed roughage with your silage.

Prof. Shaw—A man in Minnesota lost four horses last winter, all that he had, by feeding them silage without any roughage at all.

Mr. Bradley—Three years ago we had a very dry time in our country and our hay crop was very light, but we could keep the corn going by cultivation. Our silo was full, and along in March we found that all the coarse fodder we had was some two-year old straw that was in the stack and musty, but we fed those horses on silage from the middle of March till grass came, all those horses got was silage, and some of that straw, which they ate very little of, and our horses never did better work than that spring. We fed them plenty of grain and put a little of this old straw into the manger. I do not advocate feeding silage in those large quantities, but if you run out of fodder feed, the silage is first rate to have.

Prof. Shaw—We made some tests in this direction at the Ontario Station. We fed six steers and we killed two out of the six by feeding them silage alone. We gave them corn, but no other roughage, except the silage. We killed those two steers, but we saved the farmers of Ontario a great many steers. I am in favor of feeding ensilage as strongly as anybody, but I don't want the farmers to kill off their horses and steers when they can prevent it by giving them a little roughage.

Supt. McKerrow—The idea is correct, the right amount is a good thing. We are pleased with our several years' experience feeding horses with ensilage, but I wouldn't want to feed them all ensilage; at the same time, Mr. Bradley's experience goes to show that it won't kill all horses. However, I expect that his ensilage was well matured, good, sweet ensilage.

Prof. Carlyle—And he didn't feed it very long in that way.

Mr. Rietbrock—During the winter I have fed brood mares from four to five pounds a day, one ration, in connection with prairie hay and a little grain, and have had good results.

Supt. McKerrow—We aim to feed our horses according to their individuality. We have one horse that turns up his nose at ensilage, and we don't make him eat it, he doesn't eat three pounds a day probably. We have other horses that are very glad to eat up fifteen pounds a day, and that is about all we care to feed them.

Question—Is corn fodder good rough feed for horses?

Mr. Martiny—It is, if you can secure it in good condition, but too many farmers feed mouldy fodder.

# BREEDS OF SHEEP.

### Supt. GEO. McKERROW, Madison, Wis.

Many inquiries about breeds of sheep come to the office of Farmers' Institutes. Some of these show the grossest ignorance on the part of the writers in regard to the best known breeds. For this reason we will spend a few minutes today in discussing this question.

Cotswold Lambs Bred in Northern Wisconsin.

## The Wool Breeds.

First we will divide or classify the breeds along the wool line. The fine wools are produced by the Merinos; the American Merino and Delaine Merino, descended from the Spanish with American improvement, the Rambouillet of Spanish descent and French and German development.

The middle wools include such breeds as Southdown, Hampshire, Oxford Down, Shropshire, Dorset, Suffolk, Cheviot, Welsh Mountain and the Persian fat-tailed species.

The long wools are the Cotswold, Lincoln, Leicestershire, Devon Long Wool, Romney Marsh and Wensleydale. The Scotch black-faced breed may be included in this last classification.

The native homes of all these breeds, with the exception of the Merinos and Persian, are to be found in the limited area of the tight little island of Britain. In Britain, breeds have been developed to suit location, soils, markets, environments, and the fancies of the breeders in certain districts.

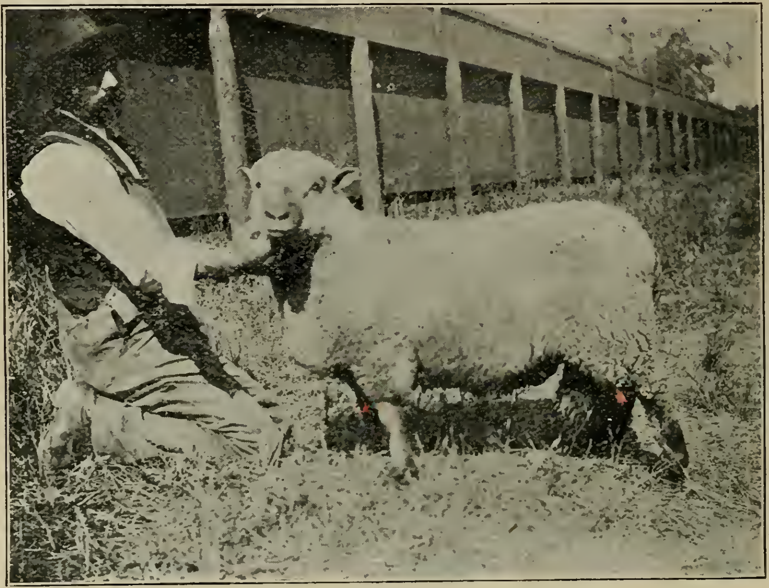
All the above mentioned long wool breeds are white in color of face and leg, except the Scotch black face. All the middle wools are dark-faced, except the Dorset and Cheviot, with the Welsh Mountain and Persian white, spotted and dark.

The American Merino, with his wrinkles, possesses the finest wool, heaviest weights of wool and yolk. The various Delaine families of this breed are quite free from wrinkles and, while by no means a mutton breed, are of a better mutton form than their wrinkly brothers. The Rambouillets are not as fine in staple, but of larger form and coarser build, with a little more of mutton form, but Merinos in their pure state are not the producers of high-class mutton.

The middle wools, and especially those of the dark-faced breeds, are the favorites of the butchers and mutton consumers of the world, as well as with the mutton producers who are looking for good and quick returns.

The Southdown stands out as the ideal of quality in mutton form, being compact and heavily fleshed in leg of mutton, loin and back cuts, as well as being of fine grain and flavor when properly fed. He is the aristocrat among mutton sheep. The Suffolk is somewhat rangier, with very good quality of flesh.

The Hampshire is of a rougher, larger, heavier-boned class, a good lamb producer and grows these lambs very rapidly, but when older does not fatten as readily as some of the other dark-faced breeds.



Prize Southdown Lamb Owned by Geo. McKerrow & Sons.

The Shropshire, but a little larger than the Southdown, but not as plump and rotund in make-up, is a very popular sheep the world over. This is probably the best known breed in this country today, having the largest number of breeders and animals recorded. This breed is a good lamb producer, carries a fleece of good quality and deserves its popularity. The craze of Shropshire breeders of late years for very wooly heads has to some extent lost the good mutton backs.

The Oxford Down is the largest and heaviest fleeced of all the Down breeds; some of its heaviest specimens weigh over four hundred pounds and probably no breed, except the Lincolns, has produced heavier weights. This is the second breed in popularity in this country among mutton breeds, as denoted by the number of breeders and animals recorded. The size, width of body, weight of fleece, production of large, good lambs, coupled with their smoothness, quality and hardiness, are the qualifications which are rapidly widening this breeds' field of popularity.

The Horned Dorset is especially noted for the production of autumn lambs for use as Christmas lambs and early winter lamb in the cities. The large horns of both sexes are, in a general way, against the popularity of the breed.

The Cheviot, a hill breed from southern Scotland, is finding many admirers, but as yet has not made much headway. It has much of the general form of body and class of wool of the Shropshire, with a white face and head free from wool.

The Persian fat-tail is more noted as yet for a curiosity than for any qualities that are outstanding along the line of utility.

The Cotswold, best known of the long wools in America, is a large, stylish, stately sheep, with a heavy fleece of long, lustrous wool of the coarse, combing class. Many of the best specimens of this breed have been imported to Wisconsin.

The Lincoln is the largest of British breeds, with wool of much the

First and second prize flocks of Oxford Downs at the Pan-American Exposition, Buffalo, 1901, own ed by Geo. McKerrow & Sons.

same quality as that of the Cotswold. This breed has had quite a boom of late years in England and has to some extent grown in popularity on this side of the water.

The Leicestershire, of much the same type and class as the two breeds just mentioned, with a head free from wool covering, has found a footing in many places on this side of the water, but cannot be said to have had any great booms. For wide, smooth backs, no breed excels them.

The Devonshire, Romney Marsh and Wensleydale breeds, of the same general characteristics as the other long wools, have not gained any popularity with American buyers.

### Some of the Mutton Breeds.

Mutton being the primary consideration for the American flock-master of today, we would not do our duty unless we discussed these breeds briefly from this standpoint.

All Merino families are very lean in their flesh and when fattened they have a tendency to put the fatty tissue around the stomach and intestines and on the kidney, more than among the muscular tissues of the body.

The middle wool breeds, when fattened, both layer and marble their meat well. This quality makes them winners both on foot and on the block and popular with buyer and consumer. Their good flesh-making qualities above mentioned are also of value in maturing the lambs early, thus giving the breeder the chance to put them on the market at almost any age from six weeks to a year.

1st Prize Pen of Horned Dorset Ewes at the English Royal Show of 1901.

The long wools place much more fat in and upon their carcasses, thus not giving as good quality of carcass, but heavy weights when mature that sell at a somewhat lower price.

The larger long wool breeds are all the products of rich low-land soils that produce large amounts of rapid growing herbage. The middle wool breeds are the products of lighter and higher soils, except the Oxford Down, whose home is in a comparatively rich district, which shows in the size and development of the largest of the Down, or dark-faced breeds. It is true that such breeds as the Southdown and Shropshire have been developed into larger frames with heavier fleeces when grown upon richer soils, where better feeds abound; thus proving that environment and care have much to do in the development of breeds.

## DISCUSSION.

Question—What sheep do you prefer?

Supt. McKerrow—My choice wouldn't help you any. If I want a large, growthy lamb, to put on the market at six or eight weeks old, I will use a larger breed than the Southdown, which I might use if I was after a mutton chop. For such lambs, I am partial to the Oxford, but the Hampshire might give as good satisfaction.

Mr. Rietbrock—Considering the conditions that prevail in this country, say Marathon county, what breed would be the best for a lot of farmers to go into? I believe with Mr. McKerrow that it would not be a good plan for one farmer to take one breed and his neighbor another, and another neighbor still another, although they might be practically equally good, but I would like to see the farmers in the same locality all have the same good breed. Is there anything in that, Mr. McKerrow?

Supt. McKerrow—Yes, there is a good deal in that if your lambs are sold in carload lots, but one farmer may aim to raise lambs to sell on the Easter market, while another would aim to raise lambs for the June market, and another to raise lambs to sell in carload lots later on in the same season, so that the same breed would not do for all of them, but if they are all going to produce lambs to put on the market at the same time, there is a great deal in having the same breed. This is a pretty big question. In Marathon county, the northern part of Clark, and all this clay loam district where these trees grow so high and wide, if you are aiming at meat production, I should say you should select a breed of animals like the trees that grow here, not especially high, but wide, thick. Considering the climatic conditions here, I should want to consider the outside covering, or overcoat, I should say that you would want a class of sheep that carried a pretty good overcoat. I would want some length and some firmness in it, fairly long and as close as you can get it to get it fairly long, but not so long that these cold winds will whip it up in the fall or in the winter. I am not in favor of a very long, lashy fleece, but rather a compact fleece. Another point, your soil must be rich here to raise these big trees and the herbage is rich, and you can develop large breeds, say, Oxfordshire, or possibly the smaller Shropshire; the Shropshire might be the best for this district.

Mr. Rietbrock—I find the Shropshires all right.

A Member—We find the Leicestershire best in Canada.

Supt. McKerrow—They are now crossing those Leicestershire flocks for lambs with some of the dark-faced breeds as a rule. That is true in England. In the white-faced districts, they are crossing a great deal with the Hampshires, Oxfords and Shropshires for the lamb market.

Question—But you did not tell us the best sheep.

Supt. McKerrow—The one that will make the most mutton on the least feed at the time when it will suit you best to sell him, so you can see you will have to do your own thinking and make your own selections. I can only give you some information and you must decide for yourself when you want to sell your lamb crop and which breed will suit your soils, methods of handling and time of selling, and the market you sell in.

# CARE AND FEEDING OF SHEEP.

R. E. ROBERTS, Corliss, Wis.

Successful sheep husbandry depends on the attention to these two essential factors, carefully carried though with the utmost regularity. It is quite as essential how feed is given to the flock as the kind given to realize the full benefit to the shepherd.

Sheep are not generally thought to be so intelligent as most of our domestic animals, however they are very sensitive to every minute that passes after the usual feeding hour has arrived; they will announce its arrival by restlessness, which means wear on their systems and loss of flesh, therefore the more regular and systematic we are in feeding, the less food it will take to keep them in good condition. The intervals should be so divided as to secure the full digestion of the food. At each time feed no more than they can consume.

## Good Feeding.

Every shepherd is cognizant of the fact that good feeding is the fundamental principal of better breeding and improvement. Its characteristics are inherited by converting the best feeds into growth, and the greatest per cent. of high-priced mutton of early maturity.

Lambs on Clover Aftermath, Sept. 1, 1903, on farm of R. E. Roberts.

We also cannot ignore the results of good feeding upon the fleece. Every set-back of the sheep by scanty, damaged, or poor feeding is marked by a weak spot in the fleece, in which the fiber breaks, the growth is arrested, and the wool is greatly reduced in value. Also guard against seeds and chaff getting into their wool, as it also depreciates its value.

Foods vary in composition. Some consist of the carbohydrates mostly, or fat formers, as timothy hay, corn fodder, oat straw, millet and corn. Others are richer in protein, or flesh and bone formers, as clover hay, oat and pea hay, oats, bran, and oilmeal.

As a guide in the choice of feeds in common use, there are tables with the nutritive ratio given. The careful feeder will make up such a ration as will be best for the purpose fed. In my experience I know of no one feed equal to clovers, but owing to the shortage of clover hay during the winter just past I have successfully fed my sheep on oat and pea hay, early cut millet hay, and corn fodder, with a light ration of bran.

Corn grown on land formerly a peat slough made tillable by tile drainage; picture taken Sept. 1, 1903 on farm of R. E. Roberts.

### Exercise.

Another point in the care of ewes during the winter is abundant and daily exercise. This is imperatively essential for the development of strong lambs. To secure this, give them the run of a cornfield from which the corn has been removed, or they can be fed corn fodder daily, when the weather permits, some distance from their barn, where they will eagerly hasten for this feed and obtain a good deal of exercise in this way. With our mutton breeds we should have ample accommodation for feeding them their hay under cover.

### Shelter.

Their barn need not be a costly structure, but must be dry and provided with an abundance of light, also well ventilated. As a sheep is naturally provided with a warm coat that is impervious to the cold, it is only necessary that it be kept dry. A dark, damp, warm barn is as a dungeon to them, in such quarters they will not thrive or eat well. Cold draughts blowing through their barn are also unhealthful. In our section of the country, where the winters are long and severe, their barn should be constructed with ample space for their hay racks, watering troughs, salt troughs, and other devices. For our mutton breeds, a safe basis from which to estimate is twelve square feet for a sheep.

### Shearing.

Shearing should be done previous to their being turned out to pasture, as the ewes that are shorn early rear the finest lambs and they put on instead of losing flesh by not carrying their fleece in the warm weather. A sheep tick can never obscure himself from the eye of the true shepherd. Ticks and sheep cannot be raised together profitably. A week after shearing, the sheep and lambs should be dipped to destroy the ticks in one of the commercial sheep dips.

### Pastures.

Sheep are especially pastoral animals and close croppers. A typical pasture is a clean, new pasture with a dense growth of short grass, so closely covering the ground that they will not pull up the root.

An old pasture is dangerous to the flock and too costly at this advanced age of agriculture, as it is more or less infected with sheep's worst enemy, internal parasites. A good dressing of air-slacked lime on an old pasture, two weeks previous to the flock being turned cut, will give good results for the labor, or divide the pasture and plow the land, grow clover, oats and peas, rape and other green crops, and double the capacity for feeding the flock, but I urgently advise the rotation of crops to keep the land pure and provide new pasture.

Stagnant or pond water should be guarded against, as it is liable to be contaminated with larve of the pestilent parasites. The flock should be supplied with pure water in troughs pumped from deep wells. A short time after the haying season is over, the sheep are turned on the meadows to graze on the tender aftermath of clover and timothy. I also sow clover or rape on all the oat land. After the grain is harvested, I turn the flock on the oat fields to pick the loose heads of grain and sweet, young clover, or rape. Handled in this manner, the flock is in good condition for the coming winter.

When we awaken to the necessities of this important industry and apply our energies in doing our best, we shall find care and food are equally as important as good blood. Blood makes individuality; care and feeding develop it. Proper care, good feeding and good breeding go hand in hand in the production of high class sheep and mutton.

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## DISCUSSION.

Question—What would you say was the cause of weak lambs? We have had them. If we did not attend to them regularly morning and night, they would be lying down in the morning, they wouldn't suckle, and some of them would die.

Mr. Roberts—If you will tell me

the conditions under which you wintered those sheep, what you fed them on, and how much exercise they had, perhaps I can give you an answer.

The Member—I fed them second crop clover, and then timothy with a little clover in it. Then about a month before lambing time, I started feeding them oats. For exercise, I had them out in the fore part of the winter nearly every day, running around the straw stack, and the yard. Later in the winter I kept them closely confined.

Mr. Roberts—The trouble was lack of exercise. If the ewes had had plenty of exercise, with a light ration of bran, you would have had strong lambs.

Supt. McKerrow—I understand you fed all your clover in the early part of the winter. I think it would have been better to have given one feed of the clover, letting it last longer, and fed some of the timothy at the same time.

Mr. Roberts—Certainly. If I only had a small quantity of clover, I would feed it lightly each day, and make it last as long as possible.

Question—Wouldn't you prefer cornstalks to timothy hay if you had them?

Mr. Roberts—Yes, sir. Good cornstalks are preferable to late cut timothy hay.

Capt. Arnold—Did you ever winter a flock of sheep on timothy hay?

Mr. Roberts—No, sir. You cannot keep sheep healthy on timothy hay alone.

Capt. Arnold—I would rather have marsh hay.

Supt. McKerrow—If you have no clover and have timothy that you must depend on largely, I would say cut it very early, before it blossoms, in the green state. It will take more work to cure it, but it will be much better for your sheep. As soon as it gets into the blossom stage, it is too woody altogether for sheep to use as any large part of their ration.

Mr. Roberts—Oats and pea hay cut early makes good feed.

Supt. McKerrow—You can feed timothy hay, if you have to feed it, with some oilmeal, oats, or ensilage.

Question—How much silage can you feed without ill effects?

Supt. McKerrow—We feed ensilage and are very well suited with it; it is the cheapest succulent feed we have ever fed. I don't think it is quite equal to roots, but it is good, but you must be sure it is good, sweet ensilage, made from matured corn, and then you can feed two fair rations a day, with some roughage, of course. Give them what they will eat up nicely in half an hour each end of the day.

Capt. Arnold—I don't think you said anything about the openings in your sheep barn.

Mr. Roberts—You want a barn well ventilated, extending east and west, with doors and windows in the south side, and windows in the east and west ends. For a small flock, I should want the doors eight feet wide; for a larger flock, twelve feet wide.

Capt. Arnold—I think it better to have the wide opening anyway; it is bad to have your sheep crowd in.

A Member—On our lands up here, we clear up the land and then put sheep on.

A Member—Clover comes naturally here, and blue grass in a short time. I believe it is a good thing to put in; while it is growing it makes very good pasture, and the sheep eat it readily. In a season or two, the white clover crowds it out, and then you have the finest kind of pasture on this new land.

Supt. McKerrow—I have never sowed grass seed on lands in northern Wisconsin, but I have sowed it on new lands in southern Wisconsin, and I find that the best mixture on new land is a mixture of timothy, June grass and medium red clover and a good amount of alsike. That makes a good mixed pasture for two or three years and by the time the blue grass and the white clover have worked in, it has become a good, continuous pasture.

Mr. Nordman—You will notice all through these slashings the white clover has started. You put in your timothy and it covers spots not covered before.

Mr. Goodrich—Cover it with alsike and you will have a better pasture.

Mr. Nordman—About how much grain ration do you give to your ewes during the winter?

Mr. Roberts—Half a pound per head per day. I feed bran during the winter, with corn fodder, oats and pea hay, and early cut millet for roughage, with good results. The bran must be moistened when fed, to prevent wind from blowing it out of the troughs.

Question—Do you prefer bran to oats?

Mr. Roberts—Yes, sir. If the sheep are in good condition, it is a more laxative feed; then toward lambing time we feed oats, and also increase the bran ration.

Question—Wouldn't flax meal be good to mix in?

Mr. Roberts—Yes, sir, but I would not feed over ten per cent. of their grain ration oilmeal.

Question—How many carrots would you feed to a flock of sheep?

Mr. Roberts—I never fed carrots to a great extent; one pound per head per day, or half a bushel to a flock of thirty head would be a good feed to start with. I would slice them.

A Member—After the lambs are old enough, I don't think you can give a sheep too many roots, but you can easily do it before that.

Mr. Rietbrock—Don't you think it would be as well to throw the roots out whole to them as to slice them?

Prof. Shaw—It would, if they could eat them, but I don't think they could eat a large rutabaga.

Mr. Stiles—Would oats and peas be good for the little lambs; I mean ground?

Mr. Roberts—Yes, sir. It is good feed. I would prefer to feed a little bran and cornmeal ground coarsely along with it and add a little oilmeal.

Question—In regard to dipping lambs or sheep, will those ticks die right away?

Mr. Roberts—They will die within a few hours.

A Member—Last year was the first time I ever dipped, and I noticed that after awhile the little fellows all came outside, and I didn't know whether I had killed them properly.

Mr. Roberts—If you have not a dipping tank, you can crowd the flock closely in a corner of the yard and thoroughly sprinkle them. The lambs can be dipped in an oil barrel.

Question—In feeding these ewes and lambs oats and peas and bran, how much per sheep would you feed?

Mr. Roberts—That depends altogether on what kind of coarse feed you have got and what you are feeding for.

The Member—I am feeding clover hay and husked corn fodder.

Mr. Roberts—I should feed a ewe a pound or a pound and a half a day if I was calculating to get those lambs onto the early market, and I should make bran one-half the grain feed, if the ewe was in good flesh.

Supt. McKerrow—If his clover hay is two-thirds of his ration, he wouldn't need so much bran.

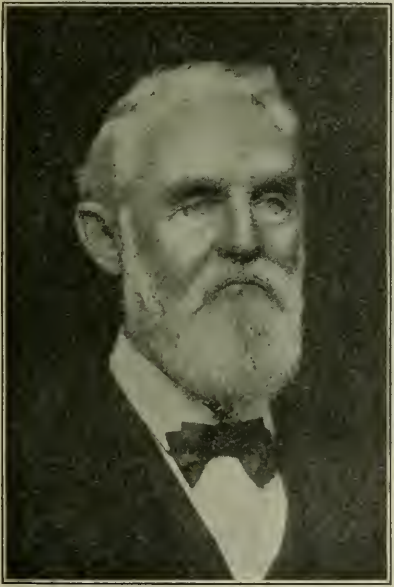
Prof. Carlyle—There is one thing I would like to say about sheep dips and dipping. We have tried four different kinds of these proprietary sheep dips and they have not any of them been entirely satisfactory. We have practiced during the past two years, in the semi-annual dipping which we give our sheep, adding a pound of powdered sulphur to each five gallons of prepared dip. Then you catch every tick and every little red louse which may be troubling your sheep. The sulphur seems to stay in the wool and acts as a sort of protection, and we find it much more satisfactory in reaching sheep ticks than is the dip alone, it doesn't do any harm and is very cheap.

Supt. McKerrow—Have you been using sulphur with the arsenical dips like Cooper's? If not, I think you will find it unnecessary. That remains in the wool.

Prof. Carlyle—Using the sulphur with the other dips simply makes them as good as the Cooper dip.

# BEEF IN WISCONSIN.

**ALEX. A. ARNOLD, Galesville, Wis.**



Mr. Arnold.

The truth of the matter is, there are few good beef cattle in this state, but so long as farmers undertake to raise beeves, it behooves them to raise the best quality and fit them for the market in a manner that will bring the greatest net returns. No farmer is rich enough, or even poor enough to afford to raise cattle that will go begging for a purchaser. The largest room in this world is the room for improvement, and if a man thinks he can make money by raising cattle with no breeding he will be disappointed, for that day has passed never to return.

As in everything else, the feeder must have an ideal beef animal in his mind's eye, else he knows not what to strive for. The beef-eating nations rule the world and people are getting more and more particular as they learn the difference between nice, juicy, toothsome beef with fine flavor, and tasteless, tough beef, such as is the result of ill-breeding, combined with poor food and neglect. Flavor is one of the essentials to promote digestion, applicable to all food for man or brute, so if we may expect good digestion, we should have fine flavored hay, cut in season and cured as much as possible in the shade. Every man who keeps track of the greatest meat market in the world at the Union Stock Yards, of Chicago, knows the reputation of Wisconsin beef. Most of our cattle sell for from $1.00 to $3.50 per hundred and but few get any where near the top, so there is ample room for lectures and improvement in this line. Cattle sell at all the way from $1.00 to $6.00 or $8.00 per hundred alive. When a feeder can clear $2.00

per hundred when he sells his steers for from $5.00 to $8.00 per hundred, how much he can make when he sells for $2.00 per hundred is a connumdrum.

### Choosing the Sire.

Experience proves that a well-bred sire is more than half the herd. A sire that is admitted to registry is the very least that can be asked, but this is not sufficient. He should be good in all desirable points for beef, and so bred that by tracing his ancestry you may find these same points prominent in all, thus insuring prepotency. This is one of the arts of good breeding and cannot be ignored.

The sire should always be kept in a vigorous condition from birth, with plenty of exercise and sunlight. Animals, like plants, flourish best in the sun. Darkness means death to every living thing, except bacteria, and there this flourishes at its best.

### How to Raise the Best Kind of a Calf.

Calves should have good, growthy mothers. With care on these points desirable steers can be produced from all cows, except the so-called most pronounced dairy type. These have their place, but not in the feed lot.

The best kind of a calf that will ripen into an ideal steer may be obtained by raising him on his dam, but in many parts of Wisconsin, where the lands are high, it is doubtful if there is enough saving of labor to justify this method where it is intended to keep a steer until it is about two and one-half years old. In raising calves by hand, new milk should be fed, warm from the cow, for at least one month, and then gradually get to skim milk, always fed at about blood heat, taken slowly and in limited quantities. When five weeks old a good calf will like a little hay and shortly a few oats, and these should be increased as fast as

Residence of Alex. A. Arnold.

practicable and not get him off his feed. I feed fine ground, sifted corn-meal, well cooked in a gruel and mixed with milk; a little at first when going from fresh to skim milk, and increasing according to his capacity. It keeps him in better flesh than oil-meal and is not as liable to cause scours.

A stunted calf seldom pays for its feed and should be disposed of as a calf. Calves should not be allowed on short, quick-grown grass; if turned to pasture it should be well-matured and the sugar well in the blade. Room for exercise in the sun is imperative, but when flies are bad they must be kept in a dark stable, or otherwise protected. Encourage a disposition to eat roughage and do not overcrowd when young. I find that a nice, fragrant clover hay will grow and fatten an animal often as fast as all the grain it can eat with over-ripe, ill-cured hay.

Like the cow that gives milk, it is not always the largest producer that yields the largest net profits; it is more likely to be the animal that best digests its food and puts the flesh where it is wanted without waste of feed.

Alex. A. Arnold's Shor horn Herd and Barn.

### The Ideal Calf.

The calf should be fed so as to cultivate a good, healthy, capacious stomach, capable of standing the strain of the final finish. Steers that have good backs and hams, short legs, and pony built, with little cheap meat and waste, that put the fat well through the carcass and finished before they are three years old, should weigh about fourteen hundred pounds and are what the markets demand and bring largest prices. These, if rightly handled, will dispose of a large amount of cheap food and give the best net returns.

The high-priced cuts are at the loin and extend on the back, decreasing in value as they approach the extremities. A good, wide back, with heavy hams, are all important in an ideal beef creature. He is a thing of beauty and a joy from his birth to the stomach of the connoisseur. He can be sold at any age at a profit, but the best returns are generally obtained by finishing him off, which should be during the last year of his life.

I feed grain all the time, except on flush feed in summer, and always aim to have a full bite of well-matured grass that has the saccharine well in the stalk. This is the kind of grass beef cattle demand and best conserves the fertility of the soil.

A miser cannot raise beef. No man can succeed with beef cattle who begrudges them their feed, nor will he obtain great success without an ideal. Making beef is something of a science, but at the same time beef feeders are born, not made. Well born and well educated make him an artist and as such he commands the admiration of his fellows.

### A Comparative Statement.

In two and one-half years, there are, in round numbers, nine hundred days. A steer will do without grain one-third of the whole time of his life, or three hundred days. The balance of the time, or six hundred days, if fed on an average of six pounds of grain per day, he should be kept growing and well finished. Call feed worth three-fourths of a cent per pound and this will be worth.. $24.00

| | |
|---|---|
| Hay and grass for 900 days at 3 cents a day | 27.00 |
| Call the calf worth | 5.00 |
| Total cost at 2½ years | $56.00 |

| | |
|---|---|
| Call this steer at the moderate weight of 1,300 pounds, and, if sold for 6 cents per pound, he would bring | $78.00 |
| A profit over and above feed of | 22.00 |
| If sold for five cents he would bring | $65.00 |
| A profit of | 9.00 |
| If sold for four cents, he would bring | $52.00 |
| A loss of | 4.00 |
| If sold for three cents, he would bring | $39.00 |
| A loss of | 17.00 |
| If sold at two cents, he would bring | $26.00 |
| A loss of | 30.00 |

In the last case, if he had eaten any grain, it is all or nearly all loss. This must be expected of ill-bred and ill-fed steers, and the farmer says it doesn't pay to feed catte. It doesn't pay even for the feed. The farmer has his fodder worked into available manure; he has each year one ring more on his cattle's horns, and all the fun he can get out of that kind of management. He doesn't like the fun, so he spends his time hauling off the fertility of his farm and selling it in the half bushel. Loss is always in proportion to the lack of quality in the produce and this maintains in all products.

I have an object lesson in my own yard. I have one quite good scrub steer that has always had the same chance as the grade Shorthorns, and there is a difference of three hundred pounds in heft and a difference of two cents per pound in value, so I have lost (say my grades are worth five and one-half cents per pound today) on heft and by reason of lack of quality $26.50 on this one steer, which has taken just as much room and just as much care and has not enriched my farm any more than a grade. I am $26.50 out by the experiment.

### DISCUSSION.

Question—Are your steers dehorned?

Capt. Arnold—Yes.

Mr. Goodrich—I take it that you

think about two and a half years is the best time to turn off a steer. You ought to get him up to 1,300 or 1,400 by that time. Now, couldn't you do better by making him grow more rapidly and selling him off sooner?

Capt. Arnold—There are a great many things to be considered in the management of a farm, and utilizing all the products of the farm. I want to utilize all the hay and straw and grain that I raise on the farm by feeding it to the cattle. If I should undertake to make baby beef, I would not be able to dispose of the roughage and cattle that are bred properly will get rid of an immense amount of roughage. There is plenty of nourishment in good hay, and very often cattle will do as well on fine clover hay as they will upon grain, with poor roughage, so I keep my steers until we call them two-year olds in order to utilize the products of the farm, and not be compelled to build too much barn room. I expect if a man has money enough and cared to buy enough grain, he would make more money, because the younger the animal is, after it gets so it can take food, the faster the growth is; that is, they can better utilize their feed, digest it with less loss than older animals.

Question—What will one of your steers weigh when a year old?

Capt. Arnold—Generally 800 pounds. A steer ought to weigh 800 pounds at a year old.

Question—And that would bring the same price on the market as at two years and a half?

Capt. Arnold—Unless he was in a very high condition, you would have to sell that steer for a stocker or feeder. Of course, they will always sell well, often as high as sale finished steers, if they have quality. I am asked when I commence to feed. I commence when a calf is about two hours old, and I keep it up, and while the first winter I do not give them but little grain, say eight pounds per day, they must be kept growing and their stomachs must be developed so they will handle a large amount of feed and so handled that they will digest and assimilate it. If you have got a weak stomach, just like any other muscle in the body, if it is small and warped, it cannot do good work, and that often comes by overcrowding with a concentrated diet, as well as by a lack of good, nourishing food.

Question—How much protein would you feed per day to a steer of about a thousand pounds and how much carbohydrates?

Capt. Arnold—I also feed a protein feed in connection with the carbonaceous feed. Corn is a carbonaceous food, the ideal feed to fatten off any creature, but there are times when you will do better with some bran. You must remember there is a great deal of difference in corn, some corn has much more protein in it than some others. If I had Flint corn, I would want more bran than if I had Dent corn.

Supt. McKerrow—Haven't you got that turned around, the Flint corn has more protein.

Capt. Arnold—It may be it is true, but I don't believe it; I mean to say digestible protein. The proof of the pudding is by eating it.

Question—But you didn't answer the question, how much protein per day?

Capt. Arnold—Well, you better feed for obtaining what you would call a growing feed. It would be in the proportion of one-sixth protein, but if you feed to the finish in the proportion of perhaps one-half of protein to six of carbohydrates, that will do for finishing off. Oats are the ideal feed for growing animals, but if you haven't got oats and you wish to raise good steers, the best way is to give them a little oats and some bran and shelled corn right along, but you don't need very much bran; if you have the oats you will have pretty nearly a growing balanced ration. Then if you want to put on a little flesh, give them more corn. To answer this gentleman's question, if you are simply feeding for growth, you give more protein. For the growing animal you want to feed about one-sixth of protein.

Question—Do you feed corn ground, cob and all?

Capt. Arnold—Yes, I think that takes the place of bran to some extent. I want to be understood that the animal should be kept growing and then the last six or eight months growing and fattening as far as possible and not waste food.

Mr. Goodrich—Would you advise a man to try to fatten u an old dairy cow to make beef of her?

Capt. Arnold—Well, this dairy cow will bring from one to two cents a pound for canning. Now, you feed that cow all winter and you may get two and a half cents a pound, and she will weigh just the same in the spring. Now, the question is, can you afford to feed a cow all winter for the sake of a half a cent? She is a good deal better beef at the end of the winter, but she does not weigh any more. She isn't good beef, even then, but she is better than any of the other cows. There is no money in it, you better sell the cow and get a steer.

Mr. Goodrich—There are a whole lot of dairymen throwing away good feed trying to make beef of old dairy cows and they are mad at the buyer and the butcher because they won't give more for them. A man had better give his feed to something that will make better use of it. My son had an old dairy cow that had not been giving much milk for awhile and she got smooth and good looking, so that the butcher was willing to give him two cents a pound. Well, he came along there delivering meat, and one day he delivered some that was almost uneatable, it was so tough, and he said to the butcher afterwards, "That was pretty hard meat you brought us yesterday." "Well," he says, "Charlie, you oughtn't to complain about that, that is part of the cow I bought of you."

Mr. Roberts—Don't you think it would be better to ship those old cows to Chicago and have them converted into canned beef and canned chicken?

Capt. Arnold—When you feed a cow up, you have got to confine her. She is used to exercise and to a warm place, and she gets restless. Altogether, it doesn't pay. The steer wants plenty of exercise, he wants his horns off, he wants good water and plenty of sunshine, and, like a man, to be contented must have his stomach kept full. The experiment at the Minnesota Station proved that steers fed twelve pounds of grain per day made as good gain as those that were fed fourteen pounds. There is no use wasting food, but the fattening steers should be what we call "crowded" at the finish. Like hogs, when ripe they should be sold.

Question—How much better will calves do when running with the cow than when fed fresh milk?

Capt. Arnold—I think you will make better shaped animals. Where land is worth as much as it is where I live, I wouldn't undertake to raise steers on their dams on high-priced land. It is all right with cheap land and labor high.

A Member—I have about 2,000 acres up here, and a great many other farmers are situated as I am. The land is there, but the question is what class of cows to put on it and how to take care of them, whether as milkers or to let the calves run with the cows. We have just as good pastures as you have down there on seventy-five, eighty and a hundred dollar land, and ours is worth fifteen and twenty.

Capt. Arnold—You have got a gold mine up here sure. If I was a young man, I would get me a large farm in northern Wisconsin and I would put a woven wire fence around the whole shooting match. You can fence a whole section with twice the amount of fence that you can 160 acres, and sixteen forties as 640 acres, with eight times what it takes to fence one forty. You can just as well keep two or three hundred head of cattle on that 2,000 acre farm as not. As soon as you have cut the trees off and sprinkled in a little seed, you have the best kind of a pasture. I have been all over this part of Wisconsin and know what I am talking about.

Question—In that case, you would let the calves run with the cows.

Capt. Arnold—Yes, I would, unless I had a whole lot of boys or children or neighbors willing to milk. You are not spending anything on this cow and calf, except this roughage, and they will get their own living in the summer time. I can take care of fifty steers as cheap as I can take care of five cows, it doesn't take any more labor.

Question—What is the best time to dehorn calves, spring or fall? And which is better, clipping or sawing?

Capt. Arnold—Oh, I don't like clipping; take a fine saw. It is only a short job and except it is very warm, fly time, or very cold in the winter, you can cut them off any time. This gentleman over here, if he is a wise man, will go and buy some grade steers. He won't go to feeding a lot of scrubs and try to make money out of it, he can't do it. Don't you know that a yearling steer that weighs 800 pounds is worth from a cent and a half to two cents a pound more than a two-year old of same size and no quality? The steer has got to be fed right from the beginning in order to mature right.

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## NEW QUESTIONS FROM BOX.

Mr. Goodrich—Now, we have some questions in the question box, and we will see if we can get them answered.

First: What are the farmers going to do about the hired help question, as it is a fact that men who are willing to work on the farm are getting more difficult to secure each year, especially up here in the northern part of the state.

Capt. Arnold—Raise more steers.

Mr. Rietbrock—Raise more boys.

A Member—Use the hired man better. I have worked out all my lifetime, and I know.

Mr. Rietbrock—One of the great difficulties in getting farm help is the very long hours of service. They do not object, I think, so much to getting out early in the morning, but they do object to being kept to work one and sometimes two or more hours after six o'clock.

A Member—Some of them spend a good deal of time in town in the middle of the day and don't get their work done.

Mr. Scribner—I think one of the secrets of the hired help question is to make the chores a part of the day's work. So many people make the chores all extra. At our place, we commence on the chores at four o'clock in the afternoon and at six o'clock we are ready for supper and the work is all done and the help have their evenings. Another suggestion, if you are a dairyman, stick up a milk sheet in your barn, your hired help will be a great deal more interested, and do their work a great deal better.

Mr. Nordman—I have tried Mr.

Scribner's plan, and have used my hired help slightly better than I use myself in order to keep them upon the farm, and I can see no real remedy, except for a man to have just what land he can work himself with his family.

A Member—I think the main trouble about this thing is that a good many people look upon a hired man as a day laborer, considerably below other people in the social scale, and no one can blame a young person for getting out of that kind of a place. Nobody likes to be looked down upon.

Capt. Arnold—I like to have my men get up at five o'clock in the morning in the summer time, and I like to have them get through at six o'clock at night. Ten hours a day is sufficient for anybody if the work is properly planned, and this working all night is nonsense. The reason why so many of us don't get along is because we don't think. It takes a manager to run a farm, a man that hasn't any brains has no business on a farm; he better go to practicing law, or something like that.

Mr. Goodrich—Question No. 2: What do you use to protect your cows from flies?

Mr. Scribner—We have tried a great many things, we have darkened the stables for one thing, but our boys don't like to milk in a dark stable. We have tried this past summer "Flyline," which is manufactured at Waukesha, and comes the nearest to being perfect of anything that I ever got hold of. If you put it on in the morning, it will last until the next morning. We apply this with a spray pump; you can go over a cow very quickly with it, and it lasts twenty-four hours. This last summer we have taken the screens from our windows and let in the air and sunlight, and have taken more pleasure in milking than in a long time.

Mr. Goodrich—Some few years ago I used carbolic acid and fish oil.

Mr. Scribner—We have tried that, and tried kerosene, and "Shoofly," but this comes pretty near being the right thing. The odor is not disagreeable.

Mr. Roberts—I have used "Zinoline" and a little tar sprayed on.

Mr. Goodrich—I know one man that made a blanket of very thin cloth, and he not only had it over the cows bodies, but down their legs, and he said he got a quart of milk more every day from each cow on account of their wearing trousers.

A Member—They would be pretty hard to keep on in this country, amongst the stumps and brush.

Mr. Goodrich—The time for closing has now arrived, we will have the report of the Committee on Resolutions and then I will call on the superintendent to make some closing remarks.

# RESOLUTIONS.

The following resolutions were submitted by the committee and adopted by the Institute.

Resolved by the Wisconsin Farmers' Institute in annual session at Marshfield,

That the thanks of the convention be extended to the people of Marshfield and vicinity for the cordial reception extended to visitors and members of the Institute force.

Also for splendid hotel accommodations, efficient work of local committee in securing reduced rates, and help extended in carrying through one of the most successful programs ever presented at a Round-up Institute.

Whereas, The more permanent improvement of the public highways of this state will result in untold benefits to all our citizens in whatever pursuits they may be engaged, and

Whereas, The greatest progress has been made in such improvement in those states where a system of state and county supervision and co-operation prevails, and

Whereas, The Good Roads Commission appointed by the governor has submitted a report to the legislature recommending the passage of a constitutional amendment empowering the state to aid in the building of good roads, the establishing of a county system at the present session, whereby a separate fund will be raised in each county for the building of good roads, and that all road taxes be paid in money, and

Whereas, Former closing Institutes have placed themselves on record as favoring some plan of state aid; therefore, be it

Resolved, That this closing Farmers' Institute of 1903, held at Marshfield, Wis., March 17 to 19, reiterate its former action on this important subject and recommend the adoption of the report of the Commission and urge the members of the legislature to enact some measure that will lead to the betterment of our public roads, under some form of state and county supervision and co-operation. Be it further

Resolved, That we favor the passage by congress of the Brownlow Bill, which provides for a system of national, state and local co-operation and aid in the permanent improvement of the postal delivery routes and highways of the United States. Be it further

Resolved, That we extend our thanks to the office of Public Road Inquiries of the U. S. Department of Agriculture for its aid and co-operation in sending its assistant director, M. O. Eldridge, and Special Agent and Road Expert, Chas. T. Harrison, to aid in the work of the Institutes, and that we heartily endorse the work of the office in its educational, supervisory and advisory efforts to further the cause of better highways. And be it further

Resolved, That a copy of these resolutions be sent to State Senator J. J. McGillivray, chairman of the Good Roads Commission, and to the office of Public Road Inquiries, Washington, D. C.

Whereas, The work of instruction and experimentation at the University of Wisconsin has been greatly hindered owing to the lack of a suitable equipment of the various breeds and classes of live stock, and

Whereas, The live stock interests of Wisconsin are of paramount importance to the farming interests of the state; therefore, be it

Resolved, That the representative farmers, stockmen and dairymen of Wisconsin, assembled in the Annual Round-up of the Farmers' Institute, do hereby earnestly request the passage of the bill now before the state legislature appropriating $10,000.00 for the purchase of live stock at the university farm.

And they also do earnestly request the passage of the bill now pending in the legislature making an appropriation for the erection of a Live Stock Judging Pavilion on the state fair grounds.

And also earnestly recommend the passage of the bills now pending in the legislature looking to better sanitary regulations in the handling of milk and other dairy products.

Resolved, By the farmers, stockmen and dairymen of Wisconsin, assembled in the Annual Round-up of the Farmers' Institutes, that we hereby demand that the money which may be appropriated by the legislature for the Wisconsin exhibits at the world's fair at St. Louis be justly apportioned according to the various interests represented, and that the live stock, agricultural, dairy and horticultural interests of the state receive their just proportion thereof.

## CLOSING REMARKS.

**Supt. GEO. McKERROW, Madison.**

Now, ladies and gentlemen, we are about closing the Seventeenth Annual Round-up Institute of the Wisconsin system. It has been my privilege to attend fifteen of these annual closing meetings, I have had the management of nine of them, and I am here to say that so far as matter is concerned, so far as the general interest of the people in attendance is concerned so far as the preparations and efforts made by the local committees who have had the local meeting in charge, and the generosity exhibited by the people of this city and the surrounding districts, that have contributed to the local expenses of this meeting, I have never attended and have never managed a better closing Institute. In fact, I am leaving you very much pleased.

We have heard much here about the fertility of your soil in central Wisconsin, the tall grasses that you raise, the magnificent crops, but the half has not been told, and the outcome of this meeting proves that there are a great many good things and a great many good people in Central Wisconsin.

I thank you for all the interest that you have taken and for what you have done in aiding and assisting us in carrying out this program; I thank you all, from the members of the local committee to everybody who has added his mite to the success of this meeting, and we leave you feeling good-natured in relation to central Wisconsin, and Marshfield in particular. I thank you.

# WOMAN'S DEPARTMENT.

## COOKING SCHOOL.

Held at Marshfield in Connection with the Closing Farmers' Institute, March 17, 18 and 19, 1903.

Conducted by **MRS. HELEN ARMSTRONG**, Chicago.

Assisted by **MRS. NELLIE KEDZIE-JONES**, Berea, Ky., and **MRS. JENNIE A. JAMISON**, Neenah, Wis.

Stenographic Report by **MISS FLORENCE J. DAGGETT**, Madison, Wis.

(Unfortunately the greater part of the report had to be omitted owing to lack of space).

## HOUSEHOLD ECONOMY.

### MRS. HELEN ARMSTRONG, Chicago, Ill.

"Household Economy" is a term which covers a large field, in fact anything which has to do with the practical side of housekeeping and home making, comes under this subject. The word economy is very much abused and often misunderstood. To some people economy signifies stingy methods, to others it means merely a saving of dollars and cents and to still others it stands for "going without things." None of these definitions is correct, for in its true signification it means frugal management without waste, a wise expenditure of time, strength and money. Many people are so economical in money matters that they overlook the fact that true economy deals with other things besides finances, and in their desire to be saving of pennies they over-exert themselves physically and mentally. A woman who will do without needed help during busy seasons, when such expense would mean economy in the end, is following a short-sighted philosophy and often must pay dearly for it in later years.

Mrs. Armstrong.

To the average housewife it is no exaggeration to say that if the work in the home were to be done daily by one pair of hands, from garret to cellar, as we would really like to see it, we would not have a moment's leisure from month to month, and outdoor life would become unknown to us. Such being the actual situation which we have to face, the question is how may we overcome these conditions and how arrange our daily living that housework instead of mastering us is itself mastered. How many women are slaves to the work we all know too well; what, then, can we do to avoid falling into the same error?

### Some Pitfalls to Avoid.

We know that a woman who must spend all her time in housework, or in fact any kind of work, is not likely to be either healthy or happy. It is not work alone which wears one out physically, but the confinement, monotony and lack of social life, combined with worry, that causes so many miserable women in both city and country homes. No woman has a right to sacrifice her health and comfort for her housework; she owes it to her family to keep well and strong. When this is not done, she becomes a wreck at middle age and usually the responsibility rests with herself.

Women are proverbially the most unselfish of God's creatures and a mother will stop at nothing which concerns the comfort and happiness of her loved ones. No sacrifice is too great, no labor too heavy, if their paths may be the easier for the doing; and she counts no time wasted if spent for her family. While all of this is natural and we none of us would wish to have her feel differently, it is sometimes a question if the best results are gained, when all self-denial falls on the mother's shoulders.

We wish our children to have a good time; we wish their youth to be a happy one and their recollections of childhood a pleasure; but is it not mistaken kindness when we always do for them and fail to teach them to do for themselves and others? Are we not encouraging selfishness in them when we carry their burdens and make life too easy? Will not the cares be all the harder when they do come?

Experience is a good teacher, but her lessons are hard ones; and if we could but learn some of these things from others, our own and our children's paths would be much brighter and broader.

We become narrow in views when all social life is cut from us, and our children learn to feel that mother is rather behind the times in her ideas if she does not get out into the world occasionally. So the mother who limits her life to the walls of her home is doing an injustice to both herself and her family. The home is the greatest thing in the world and should be the dearest place to every one in the family; but the home-mother, to be well, must get the fresh air and sunshine; to be contented, she must see other homes and children in contrast to her own; to be broad and tolerant, she must see something of human nature outside of her little circle; to be charitable, she must see those less fortunate than herself; to be wise, she must study and read; and last of all, to be appreciated, she must go away on a visit once in a while. We especially commend this last suggestion to the mother whose family has become so dependent upon her that they do not realize their own incapability, or her generosity. A lesson of this sort sometimes works wonders.

### Proper Training of Children Essential.

Where children are taught to help in the work of the home, such a lesson is rarely needed, as their co-operation shows them what the labor of housekeeping really means. Children love to help when they feel that their help is a kindness that is appreciated; not a task that must be done. When children make mistakes through inexperience and ignorance, we should encourage them to try again rather than scold and repel their loving helpfulness. Of course, it is much easier to do the task than to instruct the child to do it, but we increase his independence when we teach him. Many hands make light work, and all the family combined may lessen the daily tasks very materially, and still leave plenty of time for fun and frolic. A word of praise occasionally is a great incentive to a child and the outspoken appreciation will do wonders to encourage childish effort.

The father in the home can be of great assistance to the mother in household matters. He need not go out into the kitchen and wipe dishes in order to do this (although it won't hurt his dignity a bit to do it occasionally when the mother is tired out); but he can give her his moral support by encouraging the children rather than letting them feel imposed upon. A father who makes fun of his boy for peeling the potatoes is either a very stupid or very selfish man. No man or boy is less manly for helping mother.

In too many homes nowadays the young people carry themselves as though living in hotels at about three dollars a day. They are absolutely independent in manner and action and seem to consider home as simply a place to sleep and eat. Is that all that the word home is to mean to the coming generation? It certainly will be if we bring our children up to feel that the home is run solely for their comfort and convenience. They are not responsible for these ideas; it is the fathers and mothers who are most self-sacrificing who make this possible; and the boy who respects his parents most is the boy who works with them and who shares their joys and sorrows rather than the one who sits back and lets them wait on him. When we visit homes where we see school girls and boys who lie in bed in the morning until just time to get their breakfast and then go off to school, while the mother has all the work to do, we do not wonder if they complain when any task is required of them. The less they do, the less they are willing to do, and the child of whom no help is required will be the least ready when necessity arises. Children are very important, very necessary to our happiness and a home without children is indeed unfortunate, but a home without a mother is no home at all. So the mother should be considered first, for on her depends the happiness and comfort of the family.

## Housekeepers Should Keep up With the Times.

Women are much more conservative than men and slower to take up new ways. We do certain things because our mothers and our grandmothers did, and that better ways may be found, we rather question. When we consider the wonderful advances that have been made in other industries, we do not wonder that Miss Jane Addams so aptly referred to housekeeping as "the one belated industry." Surely we must wake up to modern methods and profit by the experiments being made for our benefit, in many ways. The agricultural school, the universities, the government experiment stations and the recent domestic science books and magazines all give their share to lighten our labors and increase our understanding. It is the woman behind the times who fails to profit by these opportunities.

The woman whose time is so wrapped up in art, literature or music that she has no time for household affairs is either unfortunately educated or unfit for her responsibilities.

Not all women are fitted for home-makers, perhaps; but all women can learn the practical side of home life if they will. There is no wonderful talent needed to be a good housekeeper, but much learning and skill may lighten the labors. When we "make our heads save our heels," as the homely old proverb says, we are doing our work intelligently. The labor of the hand alone is mechanical; when the head guides the hand the labor has both skill and dignity. No matter whether one is painting a picture or scrubbing a floor, writing a book or sweeping a room, the act is only drudgery when no brain work is back of it. When we do work well we enjoy it and if we enjoy it we must do it well. Our own consciences accuse us when we fail.

### The Ideal Home.

Some housekeepers are more nice than wise and make home such an uncomfortably clean place that no one is inclined to stay there. If our children can't have good times at home, they will go elsewhere, and unless they are allowed to bring their friends in and romp as children love to do, they cannot feel that home is the best place in the world.

To improve our home conditions we must have a new ideal to which we strive. An ideal home does not mean a place with lots of expensive furniture which needs much care, a fine wardrobe which needs many stitches and much work to keep in order, a lavish table which taxes strength, pocketbook and digestion, nor a number of servants who rule the house with impudent and ignorant service. The ideal home is a place that is healthful, comfortable and pleasant. To be a healthful place it must be cleanly, and to be easily kept clean means a simplification in furnishing.

### The Value of Sunshine and Fresh Air.

When we have furnished our home wisely and according to our means, we must then consider what is most needed to keep the home in a wholesome condition. First of all, we cannot overestimate the value of sunshine and fresh air. People in the country can have it for the asking; city folks must pay for it, the rents usually ranging according to the lightness of the rooms and the sunny exposure. Yet those who are in the country do not always profit by all its advantages. Fear of fading carpet and furniture often induces us to shut out the sunlight, and a dread of catching cold causes us to keep out the fresh air in cold weather. We forget that health depends less upon the temperature of the atmosphere than it does on its purity, that air which is breathed over and over again is filled with impurities and has become harmful instead of beneficial. Thorough ventilation goes a long way toward the prevention of disease, and our forefathers who loved an open fire-place were wiser than they knew.

### The Question of Proper Food an Important One.

Another phase of home life which might be greatly simplified is the table. We all enjoy good things to eat when in normal health, and it is only right that we should do so. Why were we given a sense of taste if it were not to be considered? The trouble usually is that our sense of taste has become over-educated or perverted, and we often crave foods which are unwholesome because we have not always been well fed in the broadest sense of the word. We need variety in our diet, but not a great variety at one time, and we forget this fact when we load our tables with articles, each good itself, but together forming a combination that is unwholesome and disastrous. When we provide a great variety of foods for a meal, we are encouraging waste of several kinds. There is first a waste of money (for even where all is saved to be used again it cannot be so economically used as originally), then there is a waste of time and energy in preparing more than is required, and last, but not least, there is the waste which means a tax on your digestive systems, either by the use of too much food or too great a variety. We all wish to be hospitable; we like to be considered good providers and we sometimes let false pride stand in the way of living up to what we know is best. We are afraid to change our methods for fear that others may think we are close; and rather than cause outside criticism, we continue to do that which our own better selves must criticise. We cannot bring about any sudden improvements with success; we must make changes gradually if we would have them permanent. As Mark Twain very aptly says, "You can't get rid of a habit by throwing it out of the window; it must be coaxed gently down the stairs, one step at a time."

Invalid's Tray.

## DISCUSSION.

Question—Will you please say something regarding household accounts—about how the husband and wife should manage the account?

Mrs. Armstrong—A certain amount of money is necessary for things in the home, and it is usually a woman's privilege to manage that part of the work—the financial part of the household affairs, if she so chooses. Every woman ought to have a certain amount of money which she does not have to account for to any one that can be used for household expenses, in whole or in part, just as she deems best. She will make mistakes in the beginning, and procure expensive things sometimes when they are not needed, but at all times I think she can make money go farther for household expenses than a man can. Whether it is necessary to write down every penny or not, I rather question, although I do believe that it is a very good plan to keep some kind of a memorandum of expenses. Many a housekeeper has learned a lesson in household economy by looking over her expense account. No matter how large a person's income may be, there is always a limit, and in each family there is a certain amount of money that must cover the household expenses. One great aid in keeping the expenses within the desired limits, is to have the food simple and inexpensive.

We want to know how to get the greatest amount of value for the money expended, and to do this we must know something about foods, food values and their preparation, and what different foods are best for the different members of the family. Certain wholesome dishes may agree with several members of your family, but agree not at all with others, and the mother likes to know why this is so, and to understand the physical conditions well enough to know what to substitute for that dish which disagrees with one of the family.

The digestibility of foods is very important indeed, and all these things require thought in selecting and preparing the food for the family, and women are now paying much more attention to these subjects than they did formerly.

There have been a number of books written on foods and the various questions of household management that many of you would find very helpful, and I think every housekeeper ought to take one good magazine.

Question—Are those books found in public libraries?

Mrs. Armstrong—Yes. Among the magazines I think the *American Kitchen Magazine* is certainly one of the best. There are some other good ones, but many devote so much space to the decoration of homes and fancy and elaborate service for the table, that they are not of much practical value to the average housekeeper. Of course we all want things to look well, but we have not time to spend in making fancy dishes and doing fancy work, and when a woman finds time to make Battenburg lace and tidies, but has not time enough to make her own bread, there is something wrong.

Question—Why do you consider baker's bread unwholesome?

Mrs. Armstrong—Oh, I do not think it especially unwholesome. I have no objection to baker's bread for some things—none at all—it makes good toast, dressing for fowls, crumbs for croquettes, etc., but for nourishment it is about the poorest stuff I know anything about. We insist upon a very white color, which is a mistake. The best bread has a somewhat creamy tinge, and what the baker puts into his bread to make it white is not a wholesome substance. And then, it seems full of air—in fact it is mostly air and crust. There is no economy in using baker's bread. Do you know that the barrel of flour which you can buy for $4 would make as much bread as you would have to pay $11 for, at the baker's? This is leaving a large margin for materials, fuel and labor. Your home-made bread, if good bread, is enough better for the extra work, even though it costs just as much as the baker's bread. Some bakers, too, use inferior grades of flour, their bread is over-raised, and contains harmful material. Bread is a very important subject, and as it is about the only article of food that appears upon our table three times a day the year round, we should try to make that food the best we can possibly.

## INDEX TO ADVERTISERS.

Page

Agricultural Epitomist ........................................ 289
American Steel & Wire Co., Woven Wire Fencing.........Cover or 319
Andrae, Julius, & Sons Company, Telephone Supplies............. 300
Arnold, Alex. A., Shorthorns, Berkshires, etc.................... 295
Arpin, John, Lumber Co., Real Estate .......................... 313

Bradley, W. C. & Chas., Shropshires, Poland Chinas .............. 268
Breeders' Gazette ............................................ 282

C. & N. W. R'y ...........272, 273, 278, 279, 286, 287, 296, 297, 308, 309
C., B. & Q. R'y ............................................... 288
Chicago Flexible Shaft Co., Sheep Shearing Machinery............ 301
C., M. & St. P. R'y ........270, 271, 276, 277, 284, 285, 292, 293, 302, 303
Commercial Poultry ............................................ 282
Convey, Thos., Poland Chinas .................................. 268
Cooper, Wm. & Nephews, Cooper Dip ............................ 306
Cornish, Curtis & Greene Mfg. Co., Dairy Supplies.............. 295
Creamery Package Mfg. Co., Dairy Supplies ...................... 300
Currie Bros.' Company, Seedsmen and Florists ................... 316
Cyclone Woven Wire Fence Co. .................................. 301

Dairy and Creamery ............................................ 283
Deere & Co., Agricultural Implements ........................... 313
DeLaval Separator Co. ................................Cover or 318
Dickinson, Albert, & Co., Seedsmen ............................. 294
Double Power Mill Co., Wind Mills, Huskers, etc.............269, 294
Drake, H. B., & Sons, Shorthorns, Poland Chinas ................ 294

Empire Cream Separator Co. ...........................Cover or 320

Farm, Field & Fireside ........................................ 282
Farmers' Review ............................................... 282
Farmers' Voice & National-Rural ................................ 282
Fisher, Jas., Chester White Swine .............................. 289
Fuller & Johnson Mfg. Co., Farm Implements ..................... 312

Green Bay, Winona & St. P. R'y.................................. 304

Page
Hansen, Chr., Butter Color ... 289
Hoard's Dairyman ... 269
Hunt, G. A. D., Poultry ... 268

Illinois Central R'y ... 314, 315

Kreuscher, Jacob, Poland Chinas ... 269

Live Stock Journal ... 282

Martin, J. W., Red Polls ... 268
Matteson, C. E., Poultry ... 269
McLay Bros., Clydesdales, Shorthorns ... 269
Michigan Farmer ... 283
Minneapolis, St. P. & St. Ste. Marie R'y ... 305
Morgan, Chas., Poland Chinas ... 268

National Feed Chart Co. ... 307
Nordyke & Marmon Co., French Buhr-Stone Mills ... 268

Ohio Farmer ... 283

Prairie Farmer ... 283

Renk Bros., Shropshires ... 268
Reynolds & Harney, Real Estate ... 313
Rietbrock, Fred, Guernseys ... 269
Rietbrock Land & Lumber Co. ... 289
Roberts, E. G., Poultry ... 269
Roberts, R. E., Poland Chinas and Shropshires ... 269
Robertson & Bissell, Shorthorns ... 268

Scribner, F. H., Jerseys ... 269
Slimmer, J., Red Polls and Berkshires ... 268
Smalley Mfg. Co., Feed Cutters, etc. ... 267
Smith, Geo. W., Shorthorns, Poland Chinas ... 269
St. Paul Farmer ... 283

Tschudy, Fred & Sons, Ayrshires, Whites, etc. ... 268

Vermont Farm Machine Co., Dairy Supplies ... 317

West, H. P., Swine ... 268
Wisconsin Central Ry ... 274, 275, 280, 281, 290, 291, 298, 299, 310, 311
Wisconsin Farmer ... 289
Wool Markets and Sheep ... 283

Zenner Disinfectant Co., Zenoleum ... 316

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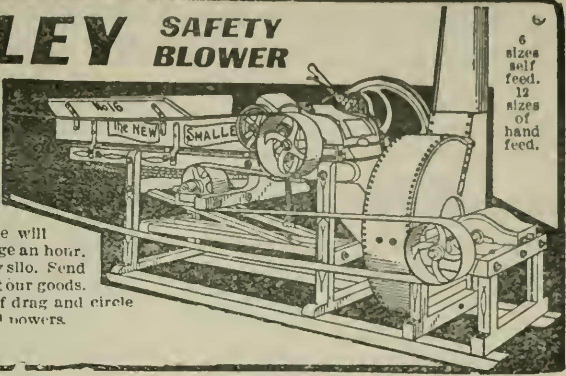

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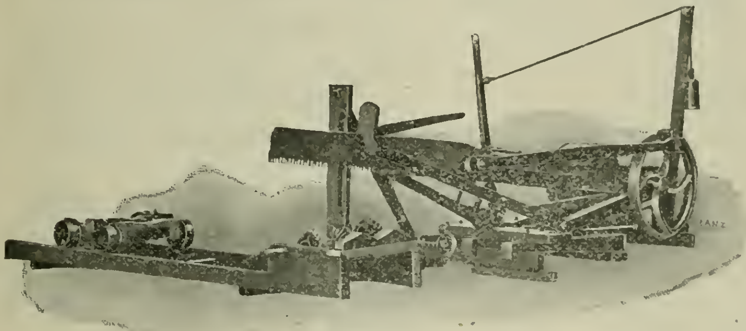

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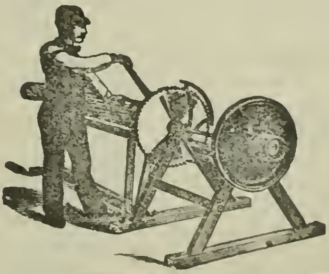

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"From Marinette, on Green Bay, to Ontonagon, on Lake Superior, is only 175 miles via the Chicago, Milwaukee & St. Paul railway, but they are miles invested with such charms of landscape, wealth of forest, field, mine, orchard and garden, and such wondrous agricultural and pastoral resources that I am inclined to tell their story to the readers of the American Sheep Breeder. And the more so because I have been often urged to the pleasant task by flockmasters of the middle and western states eager for knowledge of cheap grazing lands under promising conditions of climate and soil, social and industrial development.

### The Summer Climate is Ideal,

Never a breath of malaria has swept this north country; the air is laden with the odor of hemlock, pine, cedar, spruce, balsam, fir and balm of Gilead, borne on life-giving breezes from the great lakes; northern Wisconsin and upper Michigan are a great natural sanitarium.

### An Equally Enjoyable Winter Climate,

The snow falls in December and remains till early April; there are no blizzards, no January thaws, no winter rains, no sleet, slush or mud, no radical changes of temperature, but 70 days of reliable business sleighing with sleigh bells ringing, frost in the air, the lumberman in the woods or on the road, the mercury close around zero and the crisp, balmy air laden with ozone and bringing superabounding health, spirit, vigor and tone to men and animals. This is the ideal winter without any intermingling of fall or summer, a season that everybody who has tested it enjoys to the full. I have never yet found a resident of this upper lake country complaining of the rigors of winter, which is a far more delightful season here than in Chicago, Buffalo, New York, Boston or St. Louis, because uniform and always as enjoyable as it is healthful.

Once or twice in the season a Manitoba wave will send the mercury down to 25 below zero for four or five days, when it may be 30 below in Omaha, Kansas City, Chicago or Toronto. The country I am writing about has

### A Matchless Water Supply.

There is nothing like it—Every way one looks or drives are clear lakes, solitary, or in groups and chains, all fed by springs or spring brooks and presenting a beautiful and continuous water system by connecting inlets or outlets. These lakes may be acres or miles in extent, but everywhere they are clear as amber, generally deep and always cold.

### A Labyrinth of Bright Waters

touching or reaching into every half-section or quarter-section of land and furnishing every ranch, farm home or camp an everlasting supply of pure, cold, living and running water. These lakes and springs and streams are the glory of the country and the pride of the settlers. Next to these come the

### Native and Domestic Grasses,

The former embracing a dozen varieties of hay grass growing in luxuriance on the wild beaver meadows, which are dominated by the tall and tender "blue joint." The wild grasses of the uplands probably number thirty or more varieties, including the highly prized white clover and blue grass, both of which are indigenous to the country, and the tall, magnificent "blue stem" of the prairies, the bunch grass of the plains and mountains, the much-prized Grama grass of the Western ranges and short, sweet buffalo grass, with no end of other grazing herbage, including the wild pea vine, oat and rye grasses. Intermixed with these wild grasses are the red and alsike clovers, timothy and orchard grass. In many places these domestic grasses completely possess the land and may be cut for hay. Supplementing these grasses are an endless variety of wild browse, most of it sappy, succulent and nutritious and very fattening to sheep, goats, cattle and the wild deer that feed upon it with great relish. The bulk of all this splendid herbage is now unutilized and

### Going to Waste

for want of stock to fed it off. There is enough of this priceless herbage in a single county, now going to feed the elements, to summer graze from 200,000 to 250,000 sheep and goats, or from 15,000 to 20,000 cattle without interference with present farm operations. And this within 12 and 15 hours by rail of the greatest beef and mutton market of the world.

### In Living Green Through All the Year—

I have watched these beautiful pasture lands for the last four seasons and never yet saw them brown from heat and drought. All through this north country

### The Rainfall Never Fails,

but is as reliable as the tides. Rain makes grass and grass gives pastoral wealth far and away greater than any other rural resource. Northern Wisconsin and the Upper Peninsula of Michigan constitute the banner grass and hay country of America and, for that matter, of the world.

### Cloverland,

It passes belief how the clovers and grasses grow in these strong, retentive, moist and matchless soils. I have myself sown clover in both uper Wisconsin and upper Michigan for the last four years, not pounds but bushels of it—red and alsike clover—and apparently never lost a seed. The growth of clover is enormous and the plant never fails of two crops in a season. I have scattered seed from March to August in oats and peas, fodder corn and even on the unbroken wild land among the brush and Clover never winter-kills in this region. Never "heaves out" or freezes out. It sleeps under the snow and comes out in early April, green and fresh. It will hold its own with timothy, red top, or any hay grass, reseeding itself, and like Tennyson's brook, "goes on forever."

### Hay Farming

is immensely profitable in this northern country where timothy hay finds a ready market in the towns and lumber camps at $14 to $15 per ton and the new settler can pay for a new farm with the first crop of hay, or for an older farm in cultivation with the first three crops harvested. An average crop of timothy is two tons per acre —often more, and the first two crops of hay will pay for a new farm and the additional cost of clearing the land. I know of no other country where this can be attempted without risk of failure. Hay farming, however, is, in the long run, unprofitable, for it is a heavy draft even upon the richest lands where nothing is given back for replenishment of the soil.

### A Royal Stock Country,

That is pre-eminently what this whole region is, beginning with Marinette county, Wis., and ending with Ontonagon county, in upper Michigan. Where grasses grow with amazing spontaneity and luxuriance, never failing for want of moisture; where the clovers roll up two full rank crops; where oats and peas grow in combination into three and four tons of hay to the acre; where all the root crops yield enormously and where grazing is good from the 15th of April to the 20th of November, and the winter feeding season is not a day longer than in lower Michigan, northern Illinois, Indiana and Ohio; where the waters

(Continued on p. 276).

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**Milwaukee, Wis.**

(Continued from p. 271).

are pure and plenteous, and the grasses as nutritious and fattening as anywhere on earth, there is where cattle and sheep, swine and horses will flourish and make wealth for the soil and good bank balances for the the farmer. Do I think this

### A Good Sheep and Goat Country?

Yes, never a better! First of all there are numerous small flocks of sheep and goats in this region and almost without exception they are in prime condition, not only showing "bloom" most of the year, but giving from 90 to 175 per cent lamb crops. I saw a flock of 18 sheep and lambs in Menominee county, Mich., last week, built up from ewe lambs that I had raised in that neighborhood four years ago, that were fat enough for block or show, and did not know the taste of grain. There are small flocks of Shropshires in Ontonagon county, that have given 180 per cent lamb crops and though mainly wintered on wild hay are always fit for mutton or show. Mr. Walter Prickett has kept Angora goats and Shropshire sheep at Sidnaw, in Houghton county, for several years with profit and satisfaction. Hon. Isaac Stephenson of Marinette and Hon. Sam Stephenson of Menominee have prosperous and profitable small flocks of sheep and Angoras as they have herds of cattle and horses. There are several good sized flocks of sheep running on the open range in Marinette county that are reported as doing exceedingly well. And the wonder is that train loads of

### Sheep For Summer Grazing

are not brought into this territory in spring for lambing, then summer-grazed and shipped to Chicago in the fall.

While at Sidnaw last week I met Mr. W. D. Cook, a well-known eastern Colorado sheep-man who had selected 640 acres of cut-over land near that village as a permanent sheep ranch. He will bring 1,000 Colorado ewes to begin with and enlarge the flock as soon as he can break land and raise clover for wintering. Mr. Cook says he never saw so fine a grass country as this along the St. Paul road, nor a country so well suited for feeding sheep and lambs for the mutton market, and he predicts the building up of

### A Great Sheep and Lamb Feeding Industry

along this St. Paul road, both on account of the superior water and cheap grazing and the enormous crops of oats, barley, peas, wheat and roots that are so cheaply grown here. These cut-over lands are

### A Goat Raiser's Paradise,

and for this growing industry present the finest field in America. Sweet, sappy, fattening browse in almost infinite variety offers a tempting field for the Angora breeder. The goat is the best and quickest civilizer of raw brush land, and like sheep, is a wonderful fertilizer of the soil. Confined within goat-proof enclosures for two seasons he kills out the scrub root and branch, leaving behind him a sea of grass fit for the sheep, dairy cows, feeding cattle, or the plow. During this brief period he has worked for nothing and boarded himself, besides turning off two crops of kids and mohair. A flock of 100 Angoras or common goats, are worth more in clearing up new brush land than the best woodsman that ever wielded an axe, and the region herein reviewed would subsist all the 2.000,000 goats—Angoras or common goats—now in the United States, without consuming a blade of all the superlative grasses now growing on these cut-over lands. The goat is a browser, not a grazer, and rarely eats grass except by compulsion. There is another department of stock farming for which this region is pre-eminently suited, even in this early pioneer stage, and that is

### The Summer Grazing of Cattle,

a favorite industry with many stockmen. Cattle grow and fatten on these grasses with wondrous facility and like the wild deer of these woods, come out in the fall as sleek and fat as seals. The grass keeps green and succulent all the season through, and even the town cows are fat enough for beef in November. The brush and cedar swamps afford a grateful refuge from the flies in the heat of the day, the pure water and invigorating air give the cattle appetite and tone and the young steer, or dry cow, comes off with 250 or more pounds of additional flesh in the fall. There is

### No End of Ideal Cattle Ranches

for the summer grazier all through the country tributary to the St. Paul line from Ellis Junction to Ontonagon. I could locate hundreds of them by the springs and trout brooks and lakes of central and northern Marinette county, just across the river in Menominee county, Michigan, and other hundreds in Iron, Baraga, and Ontonagon counties, Mich., and

### Not One in an Hundred is Utilized

for this seductive, entertaining and profitable business. It is simply the purchase of feeders at the Chicago yards in the spring, running them from May to November, inclusive, and returning them to Chicago fat and quickly salable as grassfeds in late November. And there is

### The Agricultural Side

of the country which I am feebly sketching, and which to the variety farmer will have special significance. In briefly outlining the possibilities of this fertile and fruitful country for special stock farming or ranching, it is one of the best all-round farm regions in the United States. There is not a region or district in all the country of more

### Versatile Soils and Bountiful Production

than the counties herein reviewed. The lands differ in kind and texture from the dark clay-loams of the hardwood districts to the lighter and less consistent sandy loams of the pine tree districts, but everywhere they are retentive of moisture and fertilizers, always and everywhere responsive to good treatment, and everywhere give not only generous crops, but

### The Widest Range of Production

known to the middle latitudes. Winter or spring wheat grow with equal facility, and yield bountiful crops. Barley is a certain and big crop. Oats give heavier yield here than in any country of my knowledge. Ryo is an unfailing crop and so are flax and buckwheat. All the early varieties of corn mature and yield well. Field peas do better here than in any other portion of the continent and a buggy or imperfect pea is unknown. Beans do finely, cabbage, rape, turnips, mangles, beets, carrots, parsnips, kale, potatoes, onions, millet, sorghum and, indeed, every product of garden and field known to the temperate zone is as much at home here as in any part of America. This whole upper Wisconsin and Michigan country is

### A Veritable Small Farmer's Paradise,

where may be grown about everything known to husbandry, and generous crops of it, too, with delightful assurance and certainty. Not only this but the farmer has here within his own territory and at his very door the finest farm produce market on the continent. A better market than Chicago, New York or Boston, with little or no expense for transportation. In the iron and copper mines of the Lake Superior region are close to 200,000 of the best paid workers in the world and the best livers among the world's workers. In the woods and camps and lumber mills of this same region, are

(Continued on p. 284).

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## Ninety New Towns

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"If I were a man of capital with a farm in Southern Wisconsin or in any of the corn growing states, I would buy as much of the cheap land in the Northern part of Wisconsin as I could and stock it with sheep for the purpose of raising feeders to be fed on the home farm. I cannot conceive of any business being more certain in its returns than the lamb feeding business conducted in this way."

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(Continued from p. 277).

50,000 more of the best paid woodsmen and mill men in the United States and in the iron mills, pulpmills, tanneries, wood working factories, hotels mercantile houses, banks, shops, fisheries, and upper lake marine service close to 50,000 more wage earners who are better paid than in any other country. Ninety per cent of all the food stuffs consumed by this great army of men and their dependent families comes from outside, and must continue to do so for years to come. And that is why the farmers of this region have

### The Best Home Market in the World

for everything the farm can produce. The market price of beef, pork, flour, poultry and dairy products, hay, grains vegetables and fruits is always high and the demand steadily increasing. Everything the farmer grows is eagerly picked up at his very door. The summer months bring to the hundreds of lakeside resorts in all this upper country, at least 150,000 pleasure and health seekers and they must be fed upon the fat of the land. The new settler is besieged with calls for his eggs, butter, poultry, garden products milk, cream and other luxuries of garden and field and may make his own price for what he has to sell. I know of

### No Country So Easy of Settlement

as this of which I am writing. The new settler if only he shall come in the early spring, may clear away the brush and build his log cabin from the cedar, tamarack, spruce or hemlock poles that are growing on his own land and in ten days be sleeping under his own roof-tree. Two weeks more will suffice to clear and break five or ten acres for potatoes, corn and garden and by the middle of May he may have in a few acres of oats, peas, turnips and fodder corn, and all but the turnip and potato patches seeded down to clover. His cows are feeding on clover, timothy and bluegrass growing in profusion all around him, his chickens are plucking the white clover in his dooryard, his family are drinking from the purest and coldest of springs, he is master and monarch of 40 or 80 acres of land, a freeholder with his winter's supplies growing, he has no wood or coal to buy, no rent to pay and if he lacks cash to pay taxes or grocer's bills, he can get all the work he wants near home at the highest wage paid to common labor anywhere in the world. His services are worth $30 or $35 a month including board, in any lumber camp or mill and if he has a good team he can command $75 a month and board for self and team for a month or six months at pleasure. If, however, he is able to confine his services to his own land, he may cut his cedar and tamarack posts and poles, his maple timber into cord wood, his hemlock and birch and basswood into logs and his dead cedar into shingle bolts and get good money for any of them at the nearest railroad station. At the end of the first year he is further advanced in the ways of independent living than the man on the prairies, has less hardships to encounter, less risks to take and more substantial progress made. It is

### The Best Poor Man's Country

I have ever seen or known, for here the workman always has his innings. No man so poor here but by the might of his strong hands and steady purposes he may become a freeholder, the owner of a 40 or 80-acre farm and in due time an independent farmer. Nature aids him with pure air, pure water, the growing grasses, and normal health. Industry favors him with so many avenues of employment that he is never in doubt about the future. If he be level headed, determined and industrious he may aspire to ownership of a grain, fruit, dairy, poultry or sheep farm, for to him any or all of these is possible.

From end to end this beautiful north country is

### A Land of Promise,

where the poor man may grow rich through industry and thrifty management. It is a land of promise to the thousands of eastern sheepmen who want cheap grazing lands. A land o promise to thousands of western sheepmen whose overcrowded ranges sug gest the need of fresher and greener fields for their flocks. A land of promise to the flocks that are banishe from the forest reserves. A land of bright promise to ambitious dairymen who may find here green grasses and living springs in the midst of the finest dairy market fields of the continent and the fruit grower who would plan his orchard and vines where natur promotes the growth of the finest apples, pears, plums, cherries and smaller garden fruits. It is an especially promising country to the variety farmer who would follow rotative mixed farming, the surest calling among men. I have seen along this St. Paul road no land too thin and sterile to grow clover. Where clover grows there are always

### Strong Sanctions to Rural Industry.

After the clover meadows come big crops of wheat, rye, barley, oats, corn buckwheat, peas, beans, potatoes, turnips, sorghum and now I may add, sugar beets, of which the farmers of Marinette and Menominee counties are growing thousands of acres to supply the 1,000 barrel beet sugar mill which will be in operation in Menominee the coming October. Here in

### Marinette County

are the finest sugar beet fields I have seen in any of the noted sugar beet states, and it is not too much to claim for this county a degree of rural prosperity unexcelled by any county in Wisconsin. Here are scores of beautiful farms highly improved with buildings, orchards, fences and well cultivated fields that look like extended gardens, and though but 15 and 20 years removed from the primitive forests and stumps are worth to-day from $40 to $60 per acre. The farmers are prosperous, many of them opulent, and the pretty homes, fine barns, well kept roads, the public and private creameries, the splendid grain and vegetable crops and clover and timothy meadows, the herds of well bred horses and cattle, and fine school houses show a degree of rural spirit and progress rarely seen outside of the rich farm districts of the older states. It is quite surprising that this rich and prosperous farm district fronting upon Green Bay and neighboring to the prosperous cities of Marinette and Menominee, is supplemented by hundreds of thousands of acres of native woodland, cut-over land and plain lands where the work of

### Settlement and Colonization

is now going forward at a surprising pace. Within the past year the Skidmore Land Co. have sold to actual settlers near Porterfield on the Marinette branch, and Ellis Junction on the main line of the St. Paul railway, over 18,000 acres of new land upon which the work of permanent improvement is now in gratifying progress. These lands embrace choice hardwood timber tracts, cut-over pine lands and good reaches of open level plains, the latter well covered with grazing herbage and well suited for immediate occupancy by sheep and cattle men. The Skidmore people purchased 100,000 acres around and tributary to these railway stations two years ago and within that time have laid out and constructed 15 miles of public roads, making every portion of their new holdings easily accessible to the new settlers who begin life on their new farms under the most favorable conditions. The settlers them-

(Continued on p. 292).

# The Only Double Track Railway Between Chicago And the Missouri River

The Chicago & North-Western Railway is the only double-track railway between Chicago and the Missouri River at Council Bluffs.

Three fast trains each way daily between Chicago and San Francisco, and two per day between Chicago and Portland, provide for passenger traffic between the East and the Pacific Coast over this transcontinental highway. These through trains are operated on fast and convenient schedules. They are drawn by powerful locomotives and carry an equipment of Sleeping Cars, Reclining Chair Cars, Observation, Dining, Parlor, Library and Buffet Cars of the most approved type.

The perfectly ballasted roadbed of heavy steel is maintained in the highest state of efficiency, equipped with automatic block signals, interlocking switches at railway crossings, and all devices for the safety and comfort of passengers known to modern railway management.

The 9,030 miles of railway embraced in the North-Western System penetrate to every point of importance in Wisconsin, Iowa, Nebraska, Northern Illinois, Northern Michigan, Southern Minnesota and South Dakota, with eastern terminals at Chicago, Peoria and Milwaukee.

The Overland Limited, daily between Chicago and San Francisco, via the Chicago & North-Western, Union Pacific and Southern Pacific railways, is the most luxurious train in the world. It possesses the most complete arrangements for the comfort of passengers and is operated on fast and convenient schedules—less than three days en route between Chicago and the Coast.

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| **Copper Country Express** | To Marquette and Lake Superior points |

For tickets, maps, time tables and full information apply to any ticket agent

**Chicago & North-Western R'y**

# Make Your Money Make Money for You

Land purchased now in Nebraska, the North Platte Valley or the Big Horn Basin will cost from ten to fifty per cent more than a year ago, but it will cost more next year than now.

Dollars intelligently invested there to-day in farms or ranches will probably bring forth tens of dollars in a few years, just as the dollars invested not long ago are bringing similar returns to-day.

**Now is the time to make your money make money for you.**

Send a stamp to-day for illustrated descriptive booklets of the lands in Nebraska, the North Platte Valley and the Big Horn Basin. This company has no lands for sale, but each booklet contains the addresses of reliable real estate agents.

Send this coupon to-day—now.

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Burlington Route

P. S. EUSTIS,
Passenger Traffic Manager, CHICAGO.

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**All progressive Creameries and Cheese Factories** now use some Commercial Starter to secure uniform ripening, perfect flavor and keeping quality.

**Chr. Hansen's Lactic Ferment** is the leader. Being a dry powder, it will keep indefinitely and is always safe to use.

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CHR. HANSEN'S LABORATORY, Box 1143, Little Falls, N. Y.

**Clover and Blue Grass Lands,**

the finest in the country, are in the western part of Marathon County, in the Athens settlement. Athens is a village with 1,000 inhabitants. In the settlement there are about 6,000 people, most of them engaged in farming.

This section of the state has fine water; good, rich clay loam soil; is in the heart of the best dairy section of Wisconsin.

Lands can be had for from $10 to $20 per acre by actual settlers. We aim not to sell to speculators. Go and look the country over and see for yourself.

RIETBROCK LAND & LUMBER CO.,
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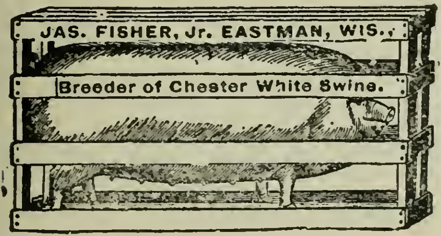
**J. FISHER,** EASTMAN, WIS.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I make a specialty of breeding the Chester white hog, and feel that I have something of superior merits to offer you. I always try to keep pigs on hand for sale, and they are priced for what they are worth. Come and see them or write for description and catalogue.

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**The Wisconsin Farmer,**

MADISON, WIS.,

Covers this field completely. The paper is published weekly and goes to the best class of farmers and stockmen in the state. Its columns are filled with the very best of Agricultural News and its advertising pages contain only the cleanest of advertising.

Write for sample copy and its card of advertising rates.

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will tell you plainly what is being done by this institution for the benefit and promotion of FARM INDUSTRY and the introduction and teaching of SCIENTIFIC FARMING, and how EVERY ONE interested in FARMING can profit therefrom with little or no expense. It also tells how one can invest money safely and with large profit. Write today and ask for our booklet—SCIENTIFIC and SUCCESSFUL FARMING. A postal will do. Address

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Along the Line of the Wisconsin Central Railway in Northern Wisconsin

The timber is hardwood, hemlock, elm, basswood, maple, spruce, tamarack, etc., of good quality.

The soil is a clay loam and very productive.

The climate is unsurpassed, a healthy, dry cold in winter and plenty of rainfall in the summer.

The water is pure and in abundance.

The roads are good and there are many of them.

Schools and churches are well distributed.

Lands can be obtained at a low price and on easy terms.

Do not forget to write for Maps and Pamphlets containing further information to

W. H. KILLEN,
Land and Industrial Commissioner Wisconsin Central Railway Co.,
MILWAUKEE, WIS.

THE HARDWOOD LANDS OF NORTHERN WISCONSIN
A GREAT DAIRY SECTION

The great adaptability of the soil for clover and grasses makes pasturage perfect.

The nights in summer are cool. The climate is bracing throughout the year and keeps animals in the best of health.

There is an excellent local market and proximity to St. Paul, Minneapolis, Milwaukee and Chicago, gives an ever constant and increasing demand for the entire product of every creamery and cheese factory located on the line of the Wisconsin Central Railway.

The snow protects the grass throughout the winter, giving early spring pasturage and the plentiful rainfall keeps grass green throughout the season, making a longer pasture period than in states further south.

Write for Pamphlets and Maps to

W. H. KILLEN,
Land and Industrial Commissioner Wisconsin Central Railway Co.,
MILWAUKEE, WIS.

(Continued from p. 285).

selves who are mostly enterprising people from the middle states, show hearty appreciation for these advantages and are pushing the development of their new purchases with commendable nerve and enthusiasm. In the land still owned and now being colonized by the Skidmore people, one often sees a beautiful, well cultivated farm sandwiched between fine tracts of wooded or cut over land, and the orchards, meadows and grain fields are most encouraging object lessons to the new settler. Their holdings are mostly in the central division of Marinette county, adjoining or neighboring the rich old farm districts and

### Will Have Commanding Value

when brought under cultivation by the new owners. This rich county, which is about as large as Rhode Island and ten times richer in agricultural and pastoral resources, has behind its rural wealth an urban population of 30,000 in the near-by twin cities of Marinette and Menominee and is easily destined to become the second most populous county in the state.

### Three Hundred Thousand Acres of Open Country

in the central and northern divisions, there is room for a full thousand sheep and dairy farms or half as many ranches. In all this open country are almost limitless fields of rich grazing herbage untrodden except in few instances by insignificant bunches of village or settlers' cattle. Not an acre of all these splendid holdings is held in reserve, but every quarter or half section is consecrated to tillers of the soil and home builders. It is very gratifying to visit the Polish and German settlers out in the Peshtigo river country and look over their fine grain fields, their big potato and pea patches, their comfortable homes and rich clover meadows. Not a stack of hay or grain outside, but all under cover and everywhere an air of thrift delightfu to see. The Skidmore people have an additional or supplementary tract of 15,000 acres of very fine cut over and hard wood timbered lands just across the Menominee river, in Menominee county, Mich., and their holdings as a whole offer as fine a field for the variety farmer, dairyman, fruit grower and sheep, goat and cattle rancher as one may find in the entire state of Wisconsin. If the reader would know more of these lands, their value, terms of sale, etc., he may do so by addressing The Skidmore Land Co., Tribune Building, Chicago, or Marinette, Wis. Four miles northward from Ellis Junction, at

### Middle Inlet,

just on the border of the Skidmore tract, is a hardwood district running eastward to the Menominee river, and embracing 2,000 or 3,000 acres of well grassed stump land well suited to either mixed farming or grazing. The soil is a rich clay-loam here and the open country large enough for half a hundred small farms. Another run of four miles northward brings us to the bright and growing little town of

### Wausaukee,

where a twenty million capacity saw mill is still running on pine logs, making wealth for the owners and thrift for a village of 1,500 souls. The Wausaukee river comes down from the northern hills in fine volume and the pretty school houses and homes, the busy stores, bank and shops, the electric light and telephone systems and a commanding high school building tell the story of a prosperous and progressive population. Hard by the town are some beautiful grain and dairy farms that would honor any of the older counties; there are sugar beet fields close on the village border that discount anything I have seen in lower Michigan, Nebraska or Colorado, but beyond these few pretty and fruitful farms and fields lies

### A Beautiful Wilderness

of cut over and burnt over land for 40 miles to the west and northwest, where the stumps are small and few, the logs mostly burnt off, and the whole country more or less covered with grass and practically ready for the plow. A more tempting grazing district would be hard to find. The visitor is always in sight of lakes, brooks or springs and amazed to see leagues on leagues of unused grassland that would make up into model stock farms or

### Ideal Sheep and Cattle Ranches.

This country, over which the writer rode with delightful senses for a half day, has grass enough to graze all the sheep in Wyoming, and the richest kind of browse for all the goats in Texas or New Mexico. It is made up of hills, valleys and miles of beautiful plains where the rancher could run 10,000 sheep and have them in sight of the dog or herder all the day long. A run of ten miles west on the Wausaukee branche of the St. Paul road brings us to

### Athelstane,

in the heart of the beautiful "plains" country, bordering upon the Wausaukee district above described. Athelstane is a new and unpretentious hamlet with one of the finest quarries of gray granite in the country, but it is the key to a very interesting colonization movement that promises much to this northern country and has already demonstrated the value of this sandy-loam region for mixed farming, dairying, gardening and cattle raising. It is moreover, the railway point for the Intervale Land Company, whose 1,200 acre

### Intervale Stock Farm

is not only the chief attraction of this beautiful open country, but the nucleus for a colony of enterprising settlers who have in the past three or four years built a good many pretty farm homes and opened out some very pretty farms in this cut over and plains country. This farm is improved with an attractive home and a score of commodious outbuildings for the housing of cattle, horses, hay, grain, etc., has 300 acres in cultivation to oats, corn, wheat, potatoes, turnips, cabbage, peas, clover, timothy and alsike and is really one of the most beautiful country places in this north region. The home, barns, sheds, stables and corrals are prettily disposed in second growth pine groves that have been grouped into a charming park and look down upon a low-lying natural meadow or intervale two or three miles in extent and which the owners are fast transforming into ideal red top, alsike and timothy meadows.

### The Clover Meadows,

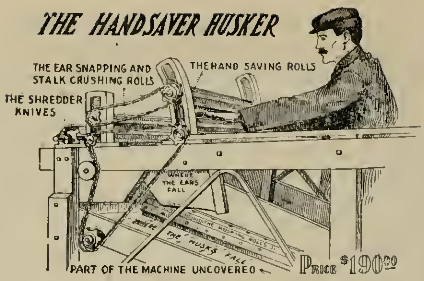
however, are the glory of Intervale, for they show how quickly the wild plains may be turned into fields of living green and made the basis for rotative farming and future productive wealth for these quick, warm and responsive sandy-loam soils. Mr. C. E. Rollins, the founder, owner and builder of these clover fields, has "found the philosopher's stone" which John Randolph interpreted to read "pay as you go," for the clover feeds the cattle and horses in winter, grazes them and the pigs in summer, enriches the land, inspires big crops and settles forever the agricultural possibilities and value of these open plains country lands.

### A Thirty-Acre Field of Corn

planted on new breaking in the middle of June and now on August 22d the corn from six to nine feet high and as heavily laden with ears as any I have seen in Illinois. They run 130 well bred cattle on this farm, mostly

(Continued on p. 302).

**THE HANDSAVER HUSKER**


THE EAR SNAPPING AND STALK CRUSHING ROLLS
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WHERE THE EARS FALL
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WHERE THE HUSKS FALL
PART OF THE MACHINE UNCOVERED
PRICE $190.00

YOU CAN'T GET HURT
HUSKS 50 BUSHELS PER HOUR
SNOW WON'T BOTHER
ASK ABOUT OUR **2 WHEEL WIND MILL**
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**Registered Shorthorn Cattle and Poland China Hogs.**

Stock of excellent breeding, and superior individual merit.

**A choice lot of young Boars and Sows for sale.**

Long distance 'Phone at Farm.

**H. B. DRAKE & SON, Beaver Dam, Dodge County, Wis.**

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CLOVERS,
RED, WHITE, ALSYKE, CRIMSON, ALFALFA,
TIMOTHY, HUNGARIAN, MILLETS, RED TOP.
BLUE GRASS, LAWN GRASS,
ORCHARD GRASS,
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DWARF ESSEX RAPE, BIRD SEEDS,
FLAX SEED, ENSILEGE CORN,
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***Creamery, Cheese Factory or Dairy.***

Hand and Power Separators, Animal Tread Powers,
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**Large and Complete Catalogue of Machinery Mailed Free.**

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# *EASTSIDE STOCK FARM,*

**Galesville, Wisconsin.**

REGISTERED

## Shorthorn Cattle, Berkshire Hogs and Lincoln Sheep.

Also White Holland Turkeys and Barred Plymouth
Rock Chickens of all Ages For Sale.

This breed of cattle has the best record for crossing on common stock for the general farmer. My hogs weigh when one year old about 400 lbs. and when matured from 500 to 800 lbs., smooth and even fleshed, standing well on their feet. Prolific breeders and good mothers. The Lincoins are the largest and best wooled of the mutton breeds and make a fine cross on short wooled sheep.

Correspondence solicited. Farm one mile from C. & N.-W. depot.

**ALEX. A. ARNOLD, Proprietor.**

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Are operated daily via the Chicago, Union Pacific and North-Western Line between Chicago and points in Nebraska, Wyoming, Colorado, Utah, California, Oregon and Washington, over the only double-track railway between Chicago and the Missouri River.

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Drawing-room and compartment sleeping cars, observation cars, dining and buffet-library cars, through without change. Electric lighted throughout. Barber, bath, Booklovers library, telephone.

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### START NOW.

THOUSANDS OF ACRES OF FERTILE LANDS capable of raising the finest quality of farm products in luxurious abundance, are for sale upon reasonable terms in

**WISCONSIN, MINNESOTA, SOUTH DAKOTA, IOWA, NEBRASKA AND WYOMING**

Reference to reliable statistics will demonstrate the fact that the pursuits of

**Agriculture, Stock-Raising and Dairying**

in these States are attended with profitable results.

**NOW IS THE TIME** to look about for a location in the great agricultural districts of the Northwest. Homeseekers' excursion tickets will be sold on the first and third Tuesdays of each month by

THE NORTH-WESTERN LINE

at a rate of one fare plus $2.00 for the round trip, to a large number of points in Wisconsin, Michigan, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, Wyoming, Colorado, Utah, Idaho, Oregon and Washington.

Particulars can be had upon application to ticket agents or to W. B. KNISKERN, Passenger Traffic Manager,

**Chicago & North-Western Ry.**

**22 Fifth Ave., Chicago, Ill.**

N. B.—Send a postage stamp for a copy of the North-Western Home Seeker.

NW43

WHAT AUTHORITIES SAY OF NORTHERN WISCONSIN

Prof. W. A. Henry, University of Wisconsin, says:

"Timothy and red clover flourish amazingly, oats yield as well as in the southern part of the state and field peas give much larger returns than further south."

Prof. John A. Craig, Iowa State College of Agriculture, says:

"It is naturally the best clover district that I have seen, and further, I do not know of any single fodder or grain crop that I would rather have for all kinds of stock than clover."

Prof. Thomas Shaw, University of Minnesota, says:

"In the timber which grows upon this land, and in the character of the soil and subsoil, we have in great part at least the explanation of the marvelous adaptation which it has to the production of timothy and clover, of blue grass and orchard grass, and indeed of almost every kind of grass that will grow in a northern country."

For further information write to

W. H. KILLEN,

**Land and Industrial Commissioner Wisconsin Central Railway Co.,**

MILWAUKEE, WIS.

SHEEP LANDS IN ❧ ❧ ❧
NORTHERN WISCONSIN

The following is an extract from an article by Col. L. D. Burch, editor of the "American Sheep Breeder" in the September, 1899, issue of that paper:

"The region visited lies about 350 miles north of Chicago, along and tributary to the Wisconsin Central Railway, and embraces an area of about 3,500 square miles, covering the Counties of Price and Ashland and contiguous portions of Bayfield and Iron Counties. This great district forms as nearly an ideal sheep country as any the writer has seen in a quarter century of almost constant travel between the great lakes and the snowy range, and from Manitoba southward to middle Texas.

Men interested in sheep raising are requested to write for further information to

W. H. KILLEN,
Land and Industrial Commissioner Wisconsin Central Railway Co.,
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**Milk and Cream Cooler-Aerator.**

Saves Time, Labor, Money and Ice.
Automatic, Simple, Cheap, Durable and Effective.

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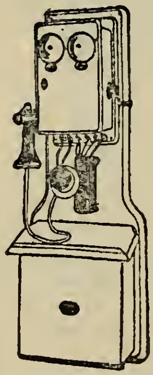
Chicago, Illinois.



**Andrae Farm Telephones**

are the best working telephones a farmer can buy. They are noted for quality and service and you'll find them on up-to-date farms in nearly every state.

The farmer with a farm telephone always knows the price of grain and stock, when to buy and when to sell; he can talk to his neighbors, the depot, the doctor; it will put him in touch with the outside world. Every farmer should have one.

***WRITE TO ANDRAE***

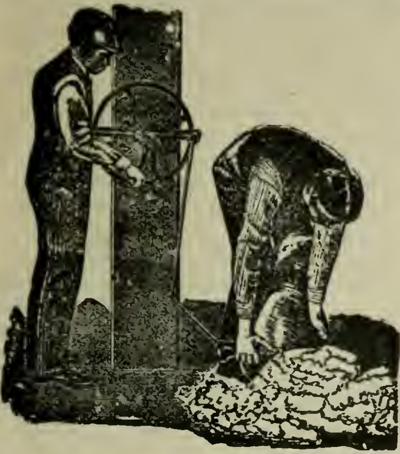
r prices and catalogues, and remember that ANDRAE arm Telephones are of the same material and strength s the ANDRAE telephones that are in use in nearly all he large cities.

**FREE.**

We will send our book "How to Construct a Farm Telephone Line," post paid, to all who write to us.

JULIUS ANDRAE & SONS CO.,
50 W. Water St., Milwaukee, Wis.

# Stewart's Patent 1904 MODEL Shearing Machine



**Price, complete, only**

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Our enormous out-put enables us to reduce the price so as to bring it within the reach of every farmer. No sheep owner having the care of ten sheep or more can afford to shear by hand, even though the work be done for nothing.

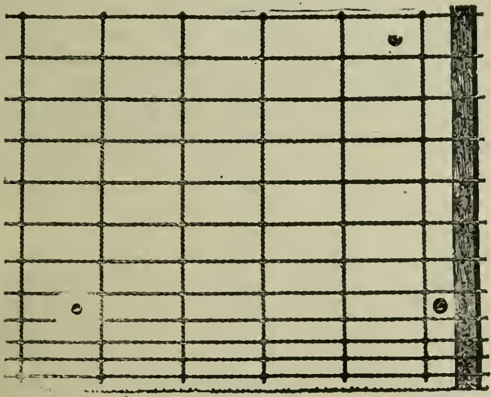
Shear your sheep with machine and. get **one pound wool extra per head.** Will more than cover the whole cost of shearing. Send today for valuable illustrated book on shearing, with hints for fast and easy shearing by R. M. Marquis.

It is free and will save you money.

## Chicago Flexible Shaft Company

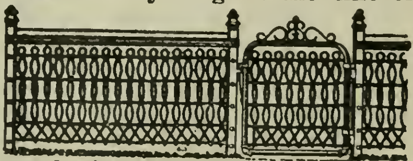
173 Ontario St., Chicago, Ill.

**The largest manufacturers of Sheep Shearing Machines in the world.**



CYCLONE FENCE is giving excellent satisfaction in Wisconsin as well as in outside territory because we have never tried to see how cheap we could make fence by using poor material and not enough of it, as many manufacturers have done to meet the close competition of recent years. Remember, we supply Wisconsin from our Waukegan Factory with everything in the line of wire fence supplies.

While we have been making ornamental fence for years, we have some very elegant new designs and have recently commenced making our complete line of ornamental fence at Waukegan, so that we are in a position to serve the Northwest as never before. See our line and prices before buying.



## Cyclone Woven Wire Fence Co., Holly, Mich., Waukegan, Ill., and Cleveland, Ohio.

(Continued from p. 293).

Galloways—and keep ten horses for saddle, road and farm service, and have a herd of Poland-China pigs, and all that is wanted to complete and perfect the situation are flocks of sheep and Angoras. Seven hundred acres of the place are still under tribute to the wild grasses, the king of which is the regal "blue stem," which grows under the pines and oaks and in the open glades and intervals four to six feet high and in many places is dense enough to cut a good swath. The farm is in the midst of

### The Intervale Colony

which has settled around the big farm in leisurely and sociable fashion—some from Iowa, Illinois and Indiana, and some from far Scandia and Germany. A score or more of good families have built homes and are opening farms here, some pretty schoolhouses are well stocked with children during the school year and the Intervale postoffice has lately been opened. Mr. Rollins and the Intervale Land Co. have 20,000 acres in the Intervale colony and a little further out on the Peshtigo river, and their chief concern now is to settle a community of sheep and Angora farmers here and turn the colony into

### A Pastoral Beulah-Land.

And why not? Never a finer grazing field was warmed by the northern sunshine. Scores of clear lakes embellish this whole region, reaching southward to Wausaukee, southwest to the Peshtigo and beyond, west twenty-eight miles and more to the green woods horizon and northwest thirty miles into the Iron Mountain country. The Intervale Land Company at Intervale, Marinette Co., Wis., will tell you a thousand things about this country that I have not time or space to give, or Mr. C. E. Rollins, 918 Royal Insurance building, Chicago, who is a capital correspondent, will tell you all you want to know. Messrs. Reed and Morton, 107 Dearborn street, Chicago, have for sale 15,000 acres of fine cut-over land, well suited to sheep farming, and mostly located in the Peshtigo valley, Marinette County.

The Anson Eldred Lumber Co., located at Stiles, Oconto County, 26 miles south of Ellis Junction, are another big land holding concern that believe in selling and civilizing their thousands of acres of cut-over, burnt over and heavily wooded lands rather than holding them for speculative purposes. Everything with them is for sale and a reasonable price put upon it. They have partially improved farms in Oconto County, wild grazing and timbered tracts in Oconto and Shawano counties and can locate the new settler on a dairy farm, a sheep or cattle ranch, a truck or fruit farm and treat him well while he improves and is paying for it. The Eldred people, too, take a strong hand in local farm improvement, and have at Stiles in full view of the St. Paul trains a large and highly cultivated dairy farm, creamery and a capacious silo for their model herd of 75 dairy cows. Their lands are finely watered with springs, brooks and lakes and offer an inviting field to the settler. The immediate country around Stiles is fairly well settled with a good class of people and lands are rapidly advancing in value.

### Northward From Wausaukee,

up the main line of the St. Paul railway are Cedarville, Amberg, Beecher Lake and Pembine, all active lumbering points from four to eight miles apart and all associated with good-sized districts of well grassed cutover stump and plains land. At Pembine we cross the "Soo" line and fifteen miles northward have spanned the Menominee river and are high up on the Menominee iron range at

### Iron Mountain,

in the Upper Peninsula of Michigan We have passed the interminable grazing fields of Marinette county and are in a new world of rugged scenic grandeur where bold granite bluffs, wild rocky gorges and glens, rapid rushing rivers and clouds of smoke from a dozen iron mines that crown the neighboring hills mark the transition from the pastoral to the ideal and industrial. Here is a mining city of 10,000 people intensely industrial and commercial and evidently quite unconscious of the latent pastoral and agricultural elements of the surrounding country. Northward twenty miles past Traders' Junction, Merriman, Granite Bluff, Randville and Sagola, each the nucleus for future farms and stock ranches where now are splendid reaches of maple, birch, basswood, cedar and hemlock woodland, brings us to

### Channing

and the Ontonagon branch of the St. Paul road. Channing is a division station village of 200 or 300 people in the midst of a hardwood district of rich soil and there are in the surrounding cut-over lands some fine locations for summer grazing cattle, but the lands are scarcely high and rolling enough for sheep raising. Fifteen miles northwest of here, however, at

### Crystal Falls

on the Crystal Falls branch of the St. Paul railway is a vast open country that appeals to the stockman on account of its superior grazing and abundant water supply Everywhere in this finely grassed cut-over country are springs, trout brooks, rivers, clear lakes and a dense growth of white and red clover, timothy and bluegrass. Judge Llewelling, a leading local attorney, estimates this open country at 200,000 acres, all within a radius of 15 miles of Crystal Falls and fit for immediate occupancy by sheep and cattle men. Most of this open district has been wooded with maple, birch, basswood, hemlock and pine and the soils are uniformly fertile and the entire district the finest of grass land. Mr. Chas. M. Rogers, the long-time register of deeds for Iron county, of which Crystal Falls is the capital, thinks this the finest grazing region in upper Michigan and though a natural dairy country with a number of very successful private dairies and creameries, believes it equally well adapted to sheep raising and says sheepmen would be cordially welcomed to its pastoral advantages. I am pleased to commend him to sheepmen who want further information of the county. Crystal Falls is a lively and prosperous iron mining city of 4,000 or 5,000 people. It has in operation a dozen or more mines and bears in every feature the impress of the prosperous and progressive industrial town. It is prettily situated on Paint river and with the development of the pastoral and agricultural country that environs it, should easily grow into a city of 10,000 souls. From Channing northward by the Ontonagon division of the St. Paul line, we pass a number of inviting grazing situations neighboring to Kelso, Ponca, Balsam, Amasa and Tunis stations, all located in fine hardwood sections and each with its complement of a thousand or two thousand acres of cut-over country. At

### Amasa,

a busy little iron mining town of 1,000 or more people, the grazing field covers 3,000 to 5,000 acres of open land well grown over with tame grasses, with neighboring beaver meadows where a thousand tons of blue joint hay could be cut for winter use. A number of deserted lumber camps offer ample winter shelter for stock and there is no end of running water.

The way to Marinette County and all points in northern Wisconsin and the upper peninsula of Michigan is via the Chicago, Milwaukee & St. Paul R'y. Address F. A. Miller, General Passenger Agent Chicago for information as to lands, tickets, time of trains, etc.

# Kewaunee Short Line

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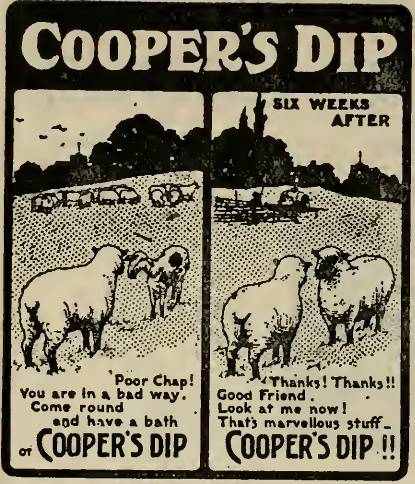
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April 20, 1903.

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I received a feed chart from you about four weeks ago and started in feeding according to instructions given and I am surprised at the result. On my twelve cows which I am milking I was getting 200 lbs. of milk per day at my way of feeding, and in three weeks' trial feeding from the chart my cows gained up to 280 lbs. per day (almost ⅓ increase) and I saved 30 cents per day in cost of feed. I can heartily recommend this chart to all dairymen as one of the greatest helps ever known to a feeder of cows.

Wishing you success, I am,

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offers the most excellent daily train service to the various summer resorts of the Great West, to the lakes and streams of Wisconsin, Northern Michigan and Minnesota, the Hot Springs of South Dakota, the mountain resorts of Colorado and Utah, and to Yellowstone National Park, California, Oregon, Washington, and Alaska.

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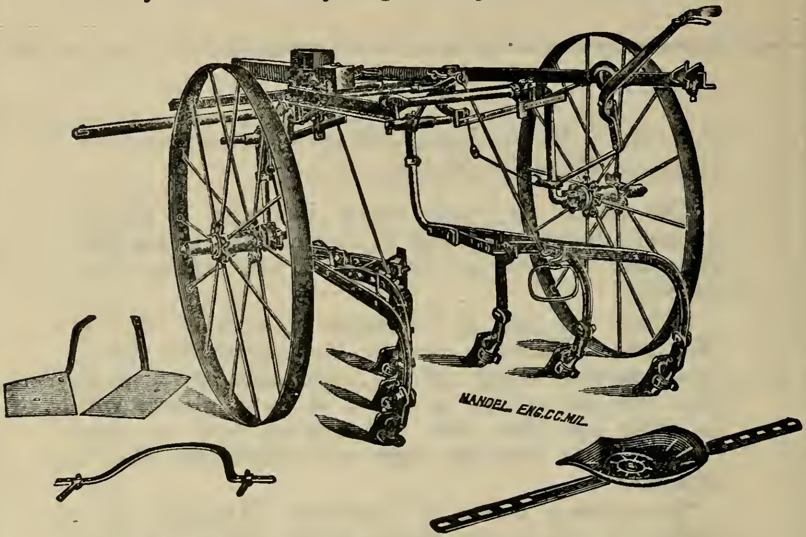
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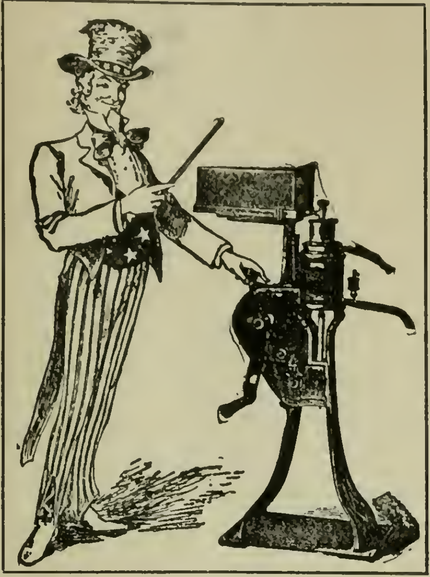

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